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ORIGINAL ARTICLES

ORTHODONTOGRAPHIC SURVEYING AND THE PREDETERMINATION OF THE DENTAL ARCH*

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MR. PRESIDENT and Members of the Harvard Odontological Society: It gives me pleasure to present before this society my work on the orthodontographic normal arch and its use in the correction of malformed arches. I am constrained to say that the conservativeness of the dentist is of such a nature that he will much more quickly accept the novelty presented by an able vendor of a new appliance, and cure-all medicines, than investigate and form an opinion and decide for himself.

Many nostrums appear promiscuously in the market, powerful advertising campaigns give them strength, the dentist is impressed with their many qualifications, and sees in them the solutions of his problems. He soon applies them, temporarily damages the patient's teeth and arch, and his own reputation more or less permanently.

What guides the orthodontist or the general practitioner in his diagnosis? Usually his supposedly trained eye. He sees a rotated cuspid, a mesial central, or a distal lateral, and quickly concludes that by applying an expansion arch and ligating these teeth to the arch in one manner or another he will, with the aid of nature, restore normal occlusion. He has not reasoned that an arch has the limitations of the principles forming it, and the results of orthodontic treatment are in direct ratio to this diagnosis. He, therefore, has no

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foundation to guide him as to how much he should do or to what extent he should go. He does it empirically.

Tonight I shall endeavor to prove that the mapping of the malformed arches, the measurements of tooth substance, and the use of the orthodontographic arches are a simple and scientific method of obtaining the normal occlusion. The orthodontographic survey is based on the principle that the sum total of the substance of the teeth of a given dental arch can only occupy a certain arch in the mouth. Therefore, charts designating the place of these teeth are accordingly made, locating the position of every tooth in the arch at the time, plus the average tooth substance for the unerupted teeth as given by Black.

The direction of thought of every profession has concentrated towards its pursuit, omitting almost to exclusion, allied subjects. This has narrowed the views of the investigator, and in many cases the concentration upon one particular point has obstructed his view, depriving him of seeing the many phases offered by the subject.

In orthodontia, the practitioner has seen in all his patients only malforma-

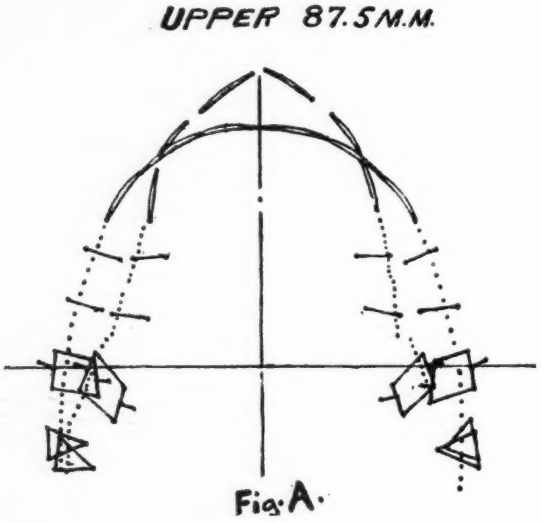


Fig. A.

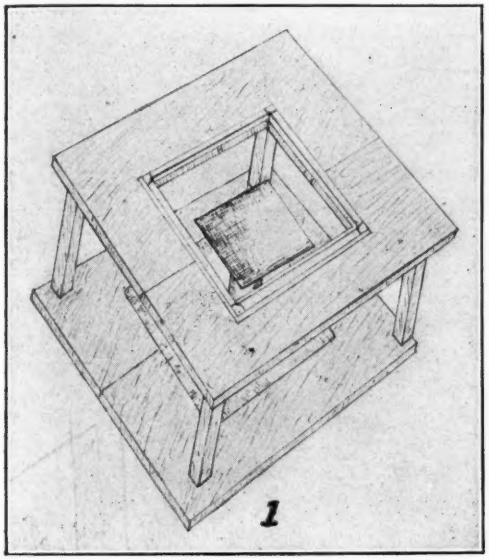
tions, just as the criminologist sees only criminals, disputing the normal cases by considering them as relatives. We propose to establish normality, a standard normal arch, based on the sum total of tooth substance, and from this standard we can compare and establish the abnormal. It is evident that a number of teeth of a given arch, aligned from contact point to contact point can not vary in formation on the arch, buccally or lingually, and be normal. It is an error to consider that the differences of average between the sum total of tooth substance of the upper and lower teeth shows abnormality; on the contrary, the proportion, as a rule, is from 8 to 12 mm. less on the lower than on the upper, which is normal. The range of tooth substance of the upper arch from the buccal groove of the first molar to its opposite mesiodistal diameters, on 400 cases has been from 78 to 101 mm. of tooth substance; 90 per cent between 82 and 89 mm.

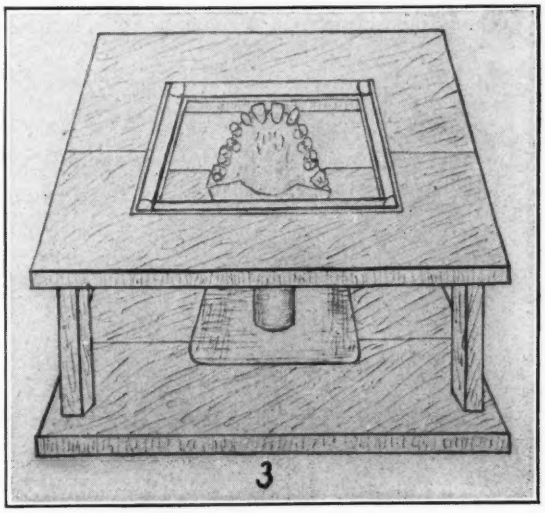
A case in which the lower is larger than the upper is very rare—1 to

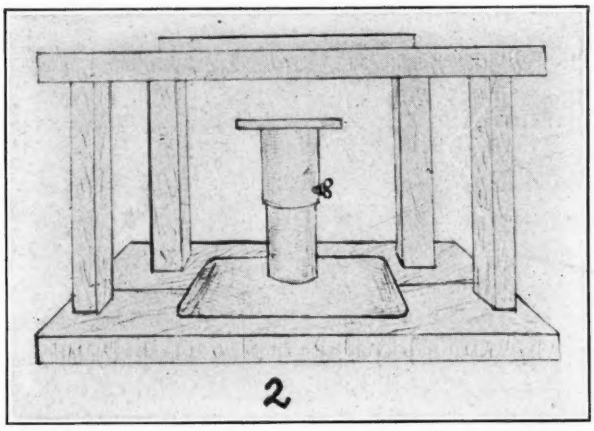
400, regarding overbites. The latitude of variations of the overbite allows us to get normal occlusion for the case in hand.

We find the cuspid to be in as many as 90 per cent of cases in proper position or nearly so, buccally or labially although the rest of the teeth may be abnormally located.

We find second molars most constantly in their normal position buccally regardless of the other complications anterior to them (see Fig. A). While each arch has its individuality shown in the cusps relation, which may vary







slightly from the normal, it could not be constructed as abnormal, inasmuch as perfect occlusion exists.

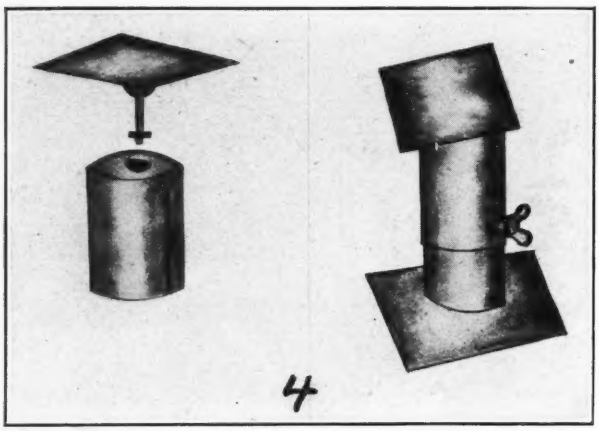
In respect to the theory of inheritance regarding the small jaw and the large teeth in the same individual, it is true only so far as nature has not developed the jaws sufficiently to accommodate the dental units. Relating to the theory of prognathism of upper and lower jaws as being normal to a particular type or individual, this also is false, as pertaining to the white race. When these deviations are pronounced, abnormality is produced, either by having a wide or narrow expanse on the molar region, in both of which cases

an abnormal expression results. Therefore, I contend, that an average normal arch based on the total sum of tooth substance, is, for the present at least, ideal for the restoration of normal arches. This is the result of necessity, inasmuch as in the past the diagnosis and the outline of procedure has been entirely a matter of personal equation.

The present survey has had its incipiency in sets of Trubyte teeth placed on arches (anatomically) corresponding to averages obtained from arches able to contain and support the definite number of teeth of a definite tooth substance. These facts being established, means to obtain surveys of those arches were devised, resulting in an orthodontographic surveying machine, an instrument with which the position of teeth in an arch may be definitely drawn.

DESCRIPTION OF APPARATUS

The apparatus consists of a mahogany table on which is mounted an adjusting leveling table so as to bring the model up to a square glass 4¼ by 4¼ inches and 1 mm. thick, one side has a fine silk finish, which takes the registra-



tion points of a pencil, this glass is attached to the upper table. (Mineral oil is used on the glass to make it transparent.) (Figs. 1, 2, 3, and 4.)

Having the machine at command, the next steps in making the orthodontographic survey are as follows:

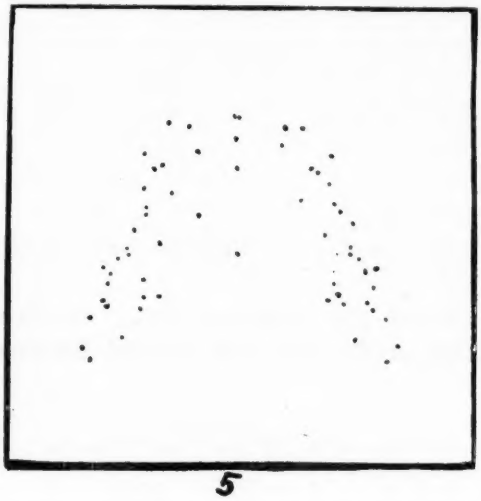
1. Get a good model—plaster impression preferred.

2. Register the cusps of molars and bicupids—contact points of the molars, bicuspids, and the six anterior teeth—get median line from mouth and register on model. After this is carefully done, place model in apparatus, and standing directly over it, register these points on the glass slide. (In registering the cusps and contact points, use one eye the same as when using the microscope.)

Remove glass, place it upon tracing board, use a very thin transparent tracing cloth held firmly over the glass, register the points on cloth, and you will have the result as shown in Fig. 5.

Fig. 6 shows teeth (anterior) drawn in, contact points of molars and bicuspids and cusp points of molars and bicuspids.

Fig. 7 shows contact points and cusp points dotted.



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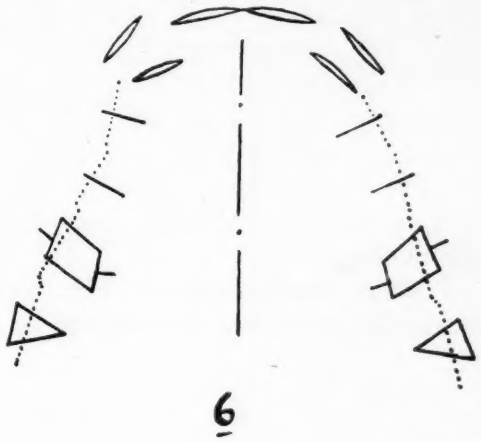

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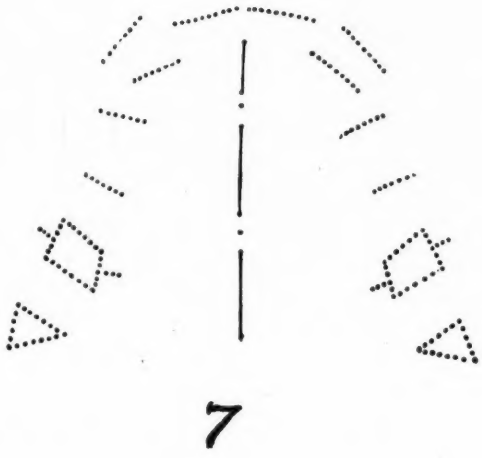

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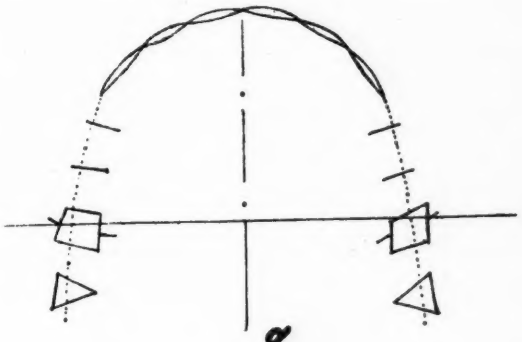
Tooth substance 80 m.m.
Arch width 52 m.m.



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Tooth Substance 72 mm.

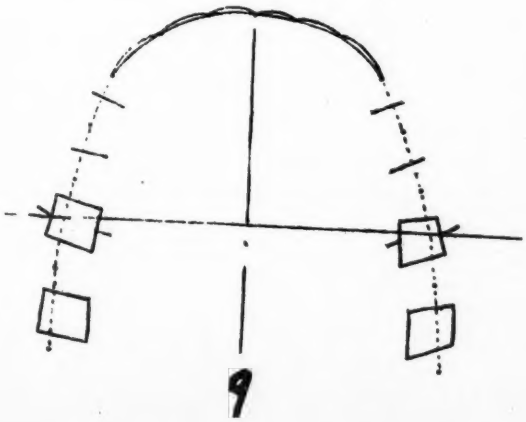

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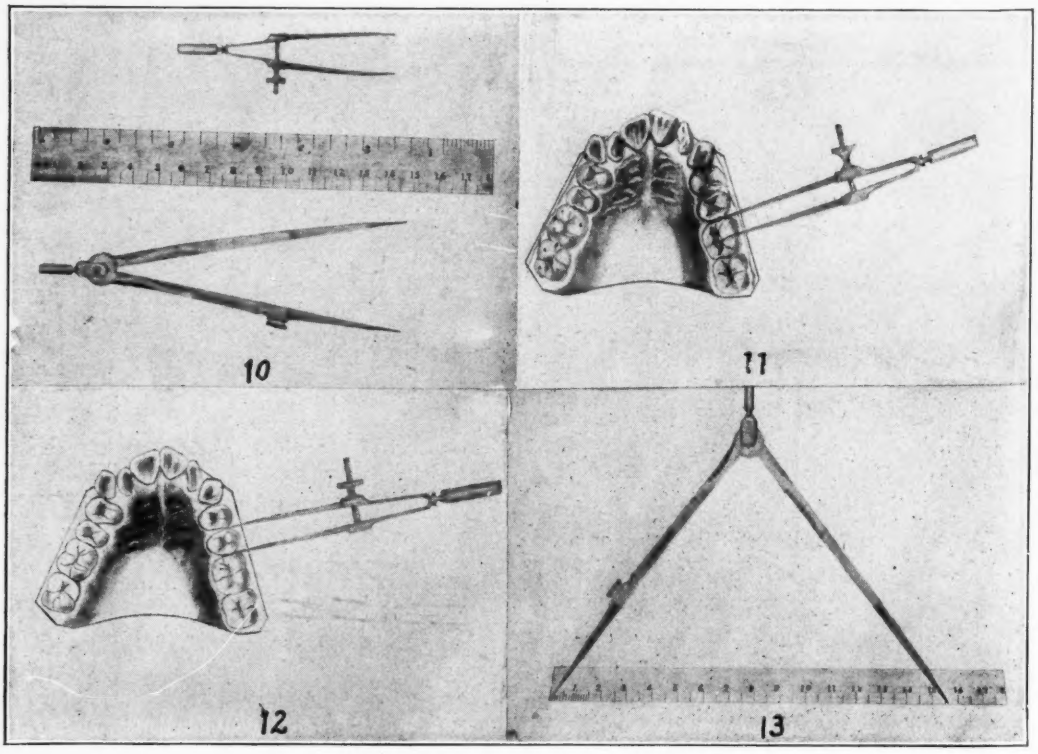
Fig. 8 shows a normal orthodontographic arch having a total tooth substance of 80 mm. and an arch width of 52 mm. in molar buccal groove.

Fig. 9 shows the normal (lower) arch of same case.

DESCRIPTION OF INSTRUMENTS

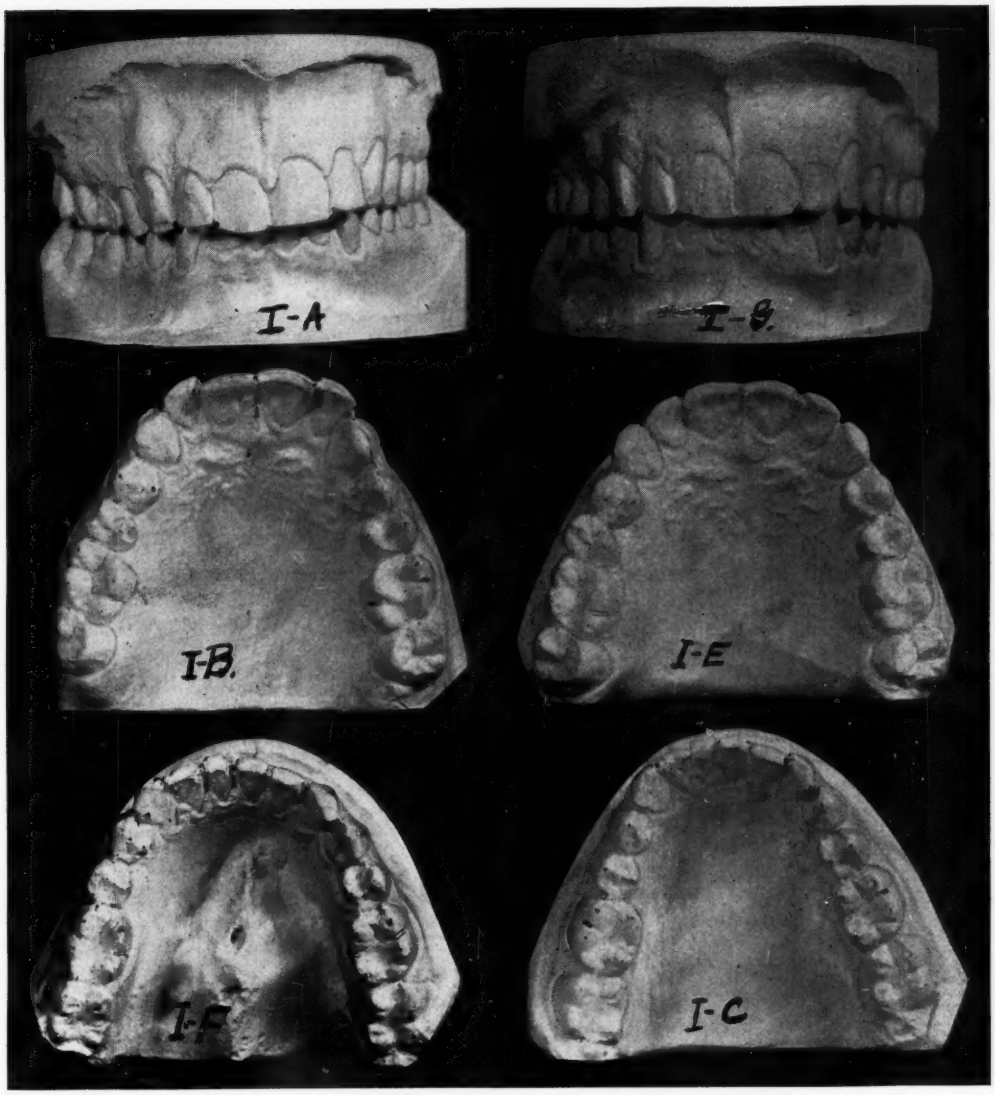
Fig. 10 represents all the instruments necessary to perform the work. They are a pair of big dividers, a pair of small dividers, a millimeter steel rule, and Faber's stenographic pencil 596. Excelsior tracing cloth is used for the tracings.

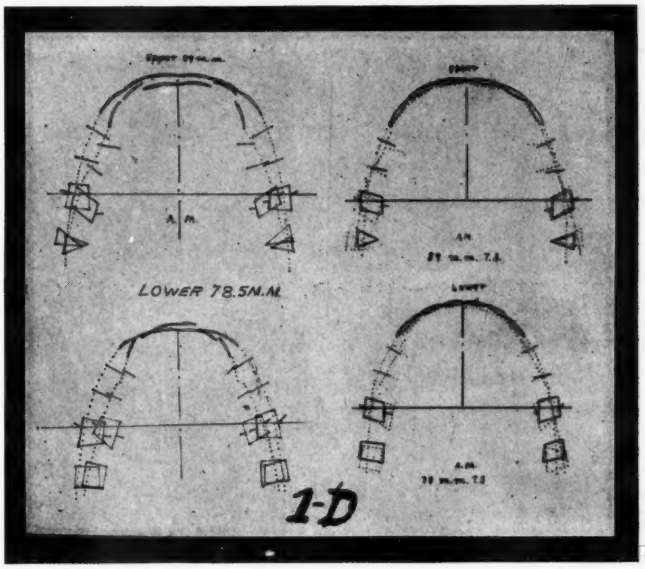
With small dividers (Fig. 11) measure the distance from occlusal side of buccal groove of first molar to contact point with the second bicuspid (as



shown in Fig. 11). Transfer this measurement by pressing the points of divider into heavy white paper. Next measure the second bicuspid from contact point to contact point as illustrated in Fig. 12. Transfer the measurement to paper, continuing from the points obtained from the molar. Fig. 11 also shows registration marks on cusps and contact points. Now follow the procedure for the rest of the teeth, that is, measure from contact point to contact point and transfer to paper, having one foot of the divider in a previous made mark and the other foot making the new mark, obtaining in this manner one continuous measurement. The opposite first molar is measured in the same manner as the previous molar. This concludes the measurements of individual teeth.

Fig. 13 shows the big dividers transferring the total measurement previously obtained to the steel rule, which gives as in Fig. 8, 80 mm. of tooth substance. In mixed dentures measure all permanent teeth present; and to their total, add the


I-A
I-B
I-B.
I-E
I-F
I-C


LOWER 78.5M.M.
1-D

total given by the missing teeth, taking the average measurement as given by Black.

DESCRIPTION OF CASES

Fig. 1*A* shows models of Class I cases (or normal molar relations). This case shows excessive overbite due to malformation of both upper and lower arches.

Fig. 1*B* shows palatal view of same case.

Fig. 1*C* shows lower arch of same case.

This case was surveyed (Fig. 1*D*). The upper arch contained 89 mm. tooth substance from the buccal grove of first molar to its opposite. The upper left-hand figure shows survey of upper malformed arch, superimposed upon the normal orthodontographic arch, containing 89 mm. to show necessary movement. The lower left-hand figure shows lower arch of same case, which contains 78½ mm. tooth substance. This shows that the molars and bicuspids require tipping instead of bodily movement. The upper right-hand figure shows the progress to date of treatment of upper arch. The lower right shows the progress survey of the lower arch to date.

Fig. 1*E* shows the palatal view of upper arch to date.

Fig. 1*F* shows the palatal view of lower arch to date.

Fig. 1*G* shows the occlusion. Note the change in overbite due to the correcting of the arch line. This case has a perfect anatomic balance.

Fig. 2*A* shows a Class I case (normal molar relations).

Fig. 2*B* shows same case, showing excessive overbite due to the elevation of the anterior maxillary division, carrying the centrals and laterals.

Fig. 2*C* shows lower arch of same case with temporary teeth.

Fig. 2*D* shows surveys of the case, before treating, and the progress to date. The upper right shows survey of upper arch, superimposed upon the normal arch of the same tooth substance. The cuspids had not erupted and the laterals had drifted towards the bicuspids. Black's average measurements were taken for the cuspids, tooth substance 83½ mm. The lower right-hand figure shows survey of lower arch superimposed upon the normal arch for this case. The lower left temporary cuspid had been extracted, and the lateral had drifted distally almost in contact with the first temporary molar. The teeth which had erupted were measured, and Black's average measurements for the permanent cuspid, first and second bicuspids on both sides, were added, giving a tooth substance of 74½ mm. The upper left-hand survey shows the progress to date of the upper arch. The lower left-hand shows the progress to date of the lower arch.

Fig. 2*E* shows the palatal view of the case to date.

Fig. 2*F* shows the occlusion to date. Note the change in overbite; this case also has anatomic balance.

Fig. 3*A*, Class I, (normal molar relations) shows outstanding cuspids and instanding laterals.

Fig. 3*B* is the same case, showing front view.

Fig. 3*C* is the palatal view of the upper arch.

Fig. 3*D* shows the survey of the original models and progress to date.

The upper left shows the survey of original model, which contains 84 mm. tooth substance, superimposed upon the normal arch. This survey shows that the movement required is nearly all in the molar and bicuspid region. The upper right cuspid is tipping out slightly. The left cuspid is in the right buccal position, but requires distal movement. The left lateral is in its position, the left central requires slight rotation. The right central is in the correct position, the right lateral requires slight mesial movement. The left lower

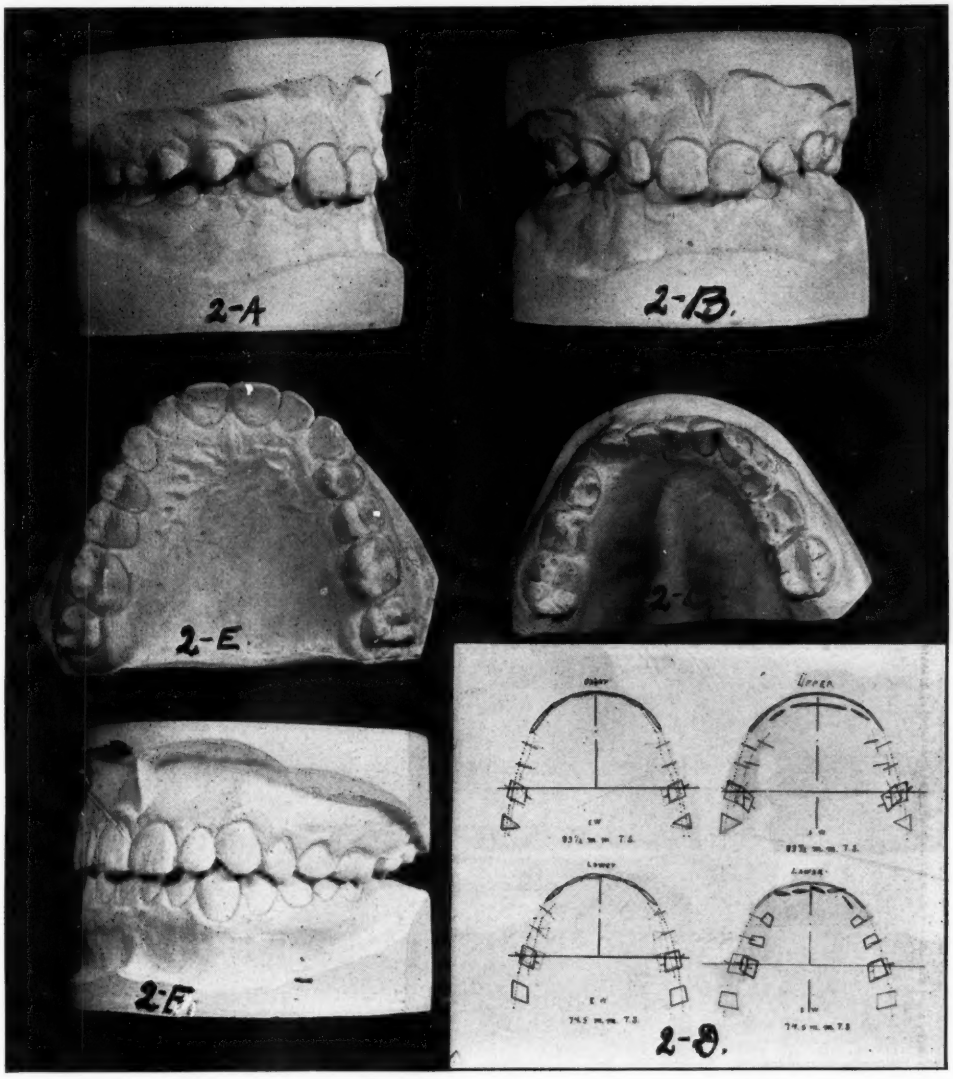
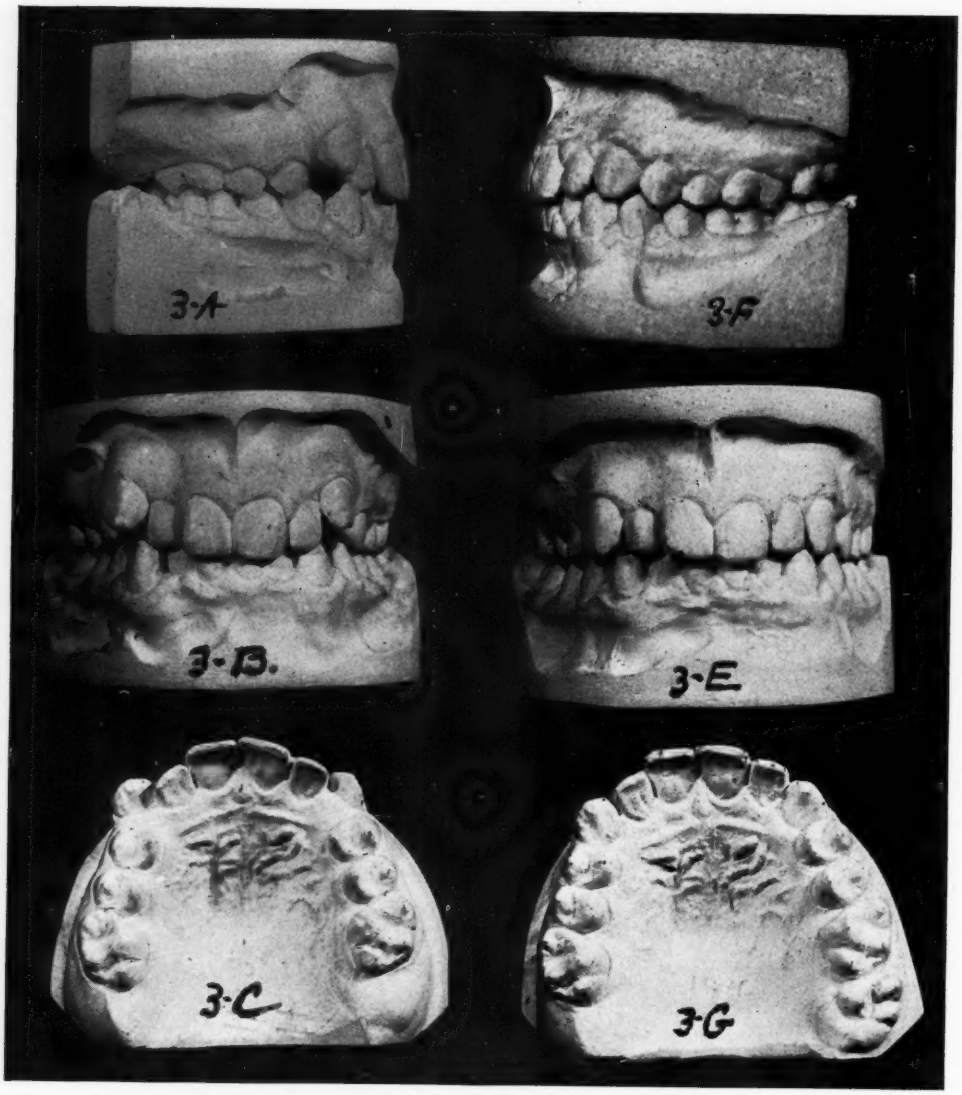


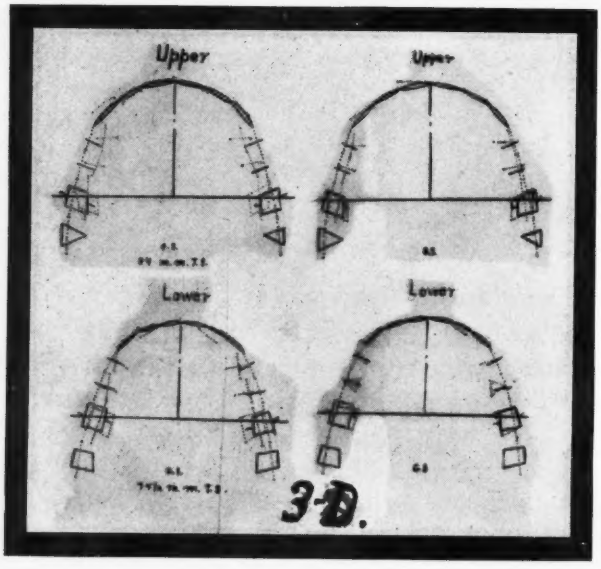
figure is the survey of the original malformed arch, superimposed upon the normal arch. The treatment indicated is molar and bicuspid expansion, also cuspid expansion, and mesial movement of right and left laterals. The right upper figure shows the progress to date of the upper arch. The right lower figure shows the progress to date of the lower arch.

Fig. 3*E* shows the front view of progress models.

Fig. 3*F* shows the side view of progress models.

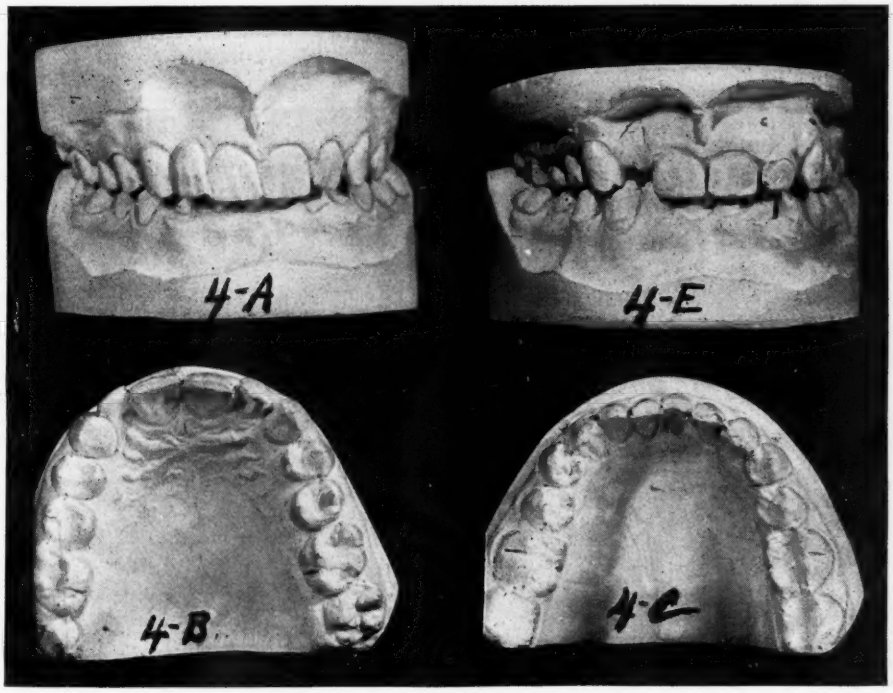
Fig. 3*G* is the palatal view of the upper arch, which requires slight rota-


3-A
3-F
3-B.
3-E
3-C
3-G


Upper
Upper
Lower
Lower
3-D.

tion of the right cuspid, right central, and slight mesial movement of the right lateral.

Fig. 4*A* shows a Class II case (distal relations of the molars). Note the excessive overbite.



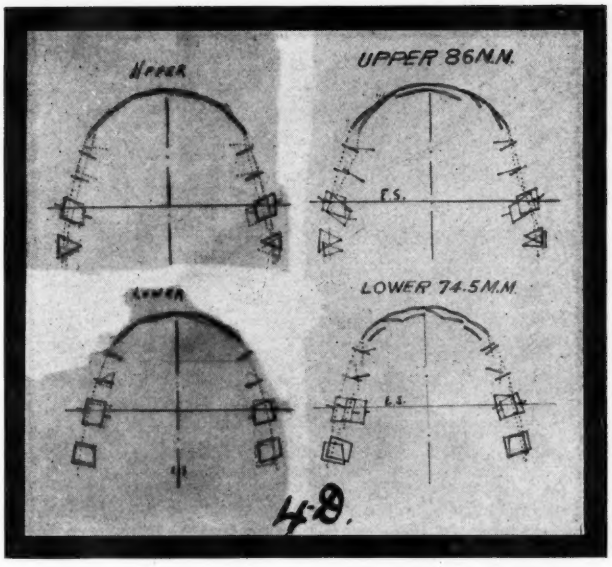
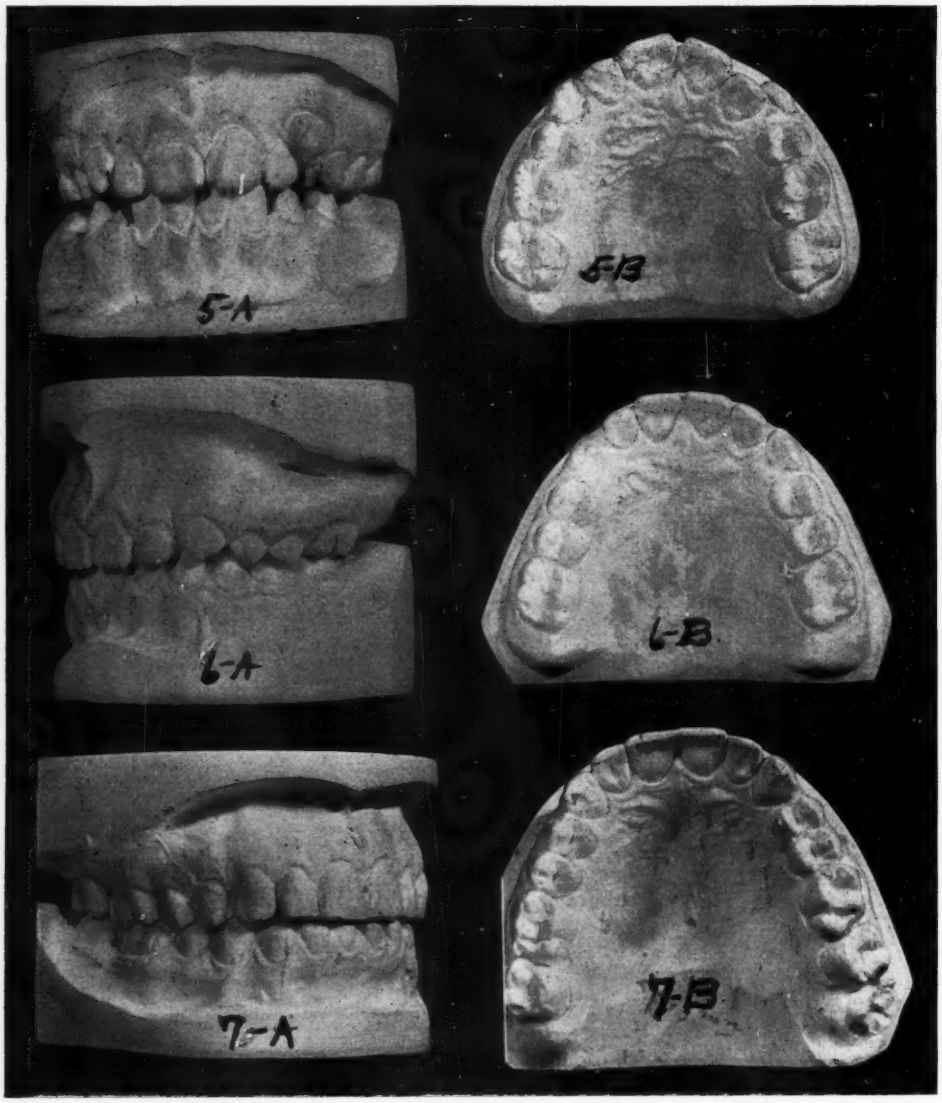


Fig. 4*B* shows the palatal view of the same case. This was complicated by congenital absence of the right lateral.

Fig. 4*C* shows the lower arch of the same case, and excessive tipping of bicuspids and molars.

Fig. 4*D* shows the surveys of the original models and progress to date. The upper right shows the original survey of the malformed arch, superimposed upon the normal arch, 86 mm. tooth substance. Note the slight movement required by the cuspids and laterals, and the greater amount of movement required by the centrals. The left molar and bicuspids require less movement than those on the right. The lower right figure is the survey of the original malformed arch, superimposed upon the normal arch, 74½ mm. tooth



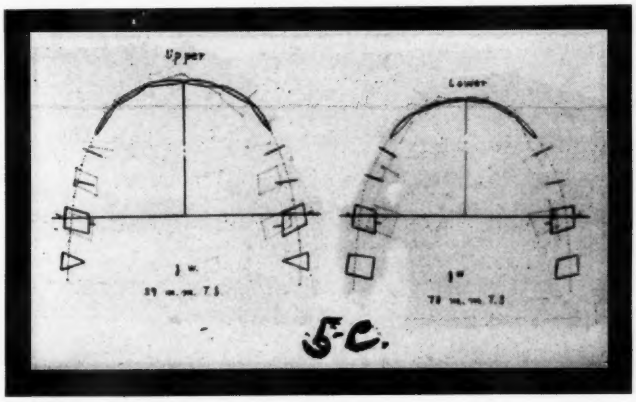
substance. This survey shows that the first molars and bicuspids should be tipped, not moved bodily, the cuspids expanded, mesial movement to take place, and rotation of the four incisors. The upper left shows progress survey to date of the upper arch. The lower left shows the lower arch progress survey to date.

Fig. 4*E* shows progress models to date (these are compound study models). Note the change in overbite. The upper left lateral has a collar

with spur running over cuspid to prevent rotation. By placing the teeth in their correct arch form or as nearly correct as possible to date, the lower jaw has assumed its normal mesiodistal position, therefore, I contend that in all Class II cases it is only necessary to place the teeth in the correct arch line, and intermaxillary rubbers are not required.

Fig. 5*A* shows a case with left upper cuspid apparently in a buccal position with instanding lateral.

Fig. 5*B* shows palatal view of same case. Note second temporary molars still in position.



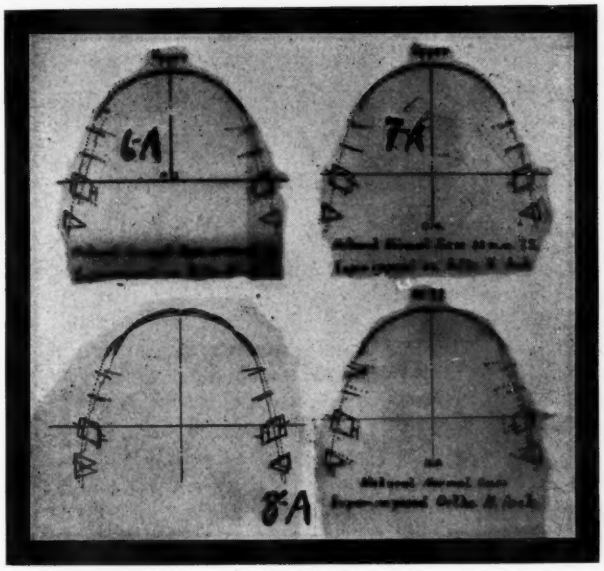


Fig. 5*C* shows surveys of both upper and lower arches of the case, tooth substance upper arch 89 mm., lower arch 78 mm. Note on the upper survey the fact that the tooth movement required is all on the left side of arch. The cuspid instead of being outstanding is in the arch line, but it requires distal movement. The lower arch requires movement on both sides, but the movement required is tipping, not bodily movement.

To prove that my orthodontographic surveys are correct, I will present four surveys of Nature's normal arch.

Fig. 6*A* shows the occlusion of Nature's work.

Fig. 6*B* shows the palatal view of the same case. Note the right cuspid just erupting through the gum.

Fig. 7*A* shows another one of Nature's perfect arches.

Fig. 7*B* shows the palatal view of the same case.

Fig. 8*A* shows surveys of four of Nature's normal arches, superimposed upon the orthodontographic normal arches of the same tooth substances. The survey 7*A* is a survey of the model 7*A;* note the slight movement of the first and second molar on the left side, due to extraction of the left lower first molar. 6*A* survey is a survey of model 6*A*.

CONCLUSIONS

1. The orthodontographic survey gives a positive diagnosis.
2. Symmetry and asymmetry of the arches are obtained by the superposition of the proposed normal over the abnormal survey.
3. The drifting (mesially) of molars is correctly shown.
4. Conveys a definite diagnosis to patient.
5. Facilitates the designing and construction of apparatus, correct and complete for carrying the case through.
6. It is the medium by which we obtain a continuous checking up in the progress of the operation.
7. It definitely establishes the completion of the operation.
8. It clearly indicates singly or ensemble any recurrence of malocclusion after dismissal.
9. It permits the continuity of work without duplication or chance of error upon a patient changing his residence.

DISCUSSION

Dr. Harold De W. Cross, Boston, Mass.—The remarks which I shall make relative to the subject of the evening bear entirely on the phase of occlusion rather than orthodontia, and my interest in occlusion is my reason for appearing in this discussion. I believe the plan of orthodontographic survey supplies a simple and accurate means of obtaining definite results which can only come from some method of advance knowledge. Heretofore there has been, as you all know, more difficulty in knowing definitely *where* and *how much* to move teeth rather than *how* to accomplish it.

The orthodontographic plan recognizes "occlusal" features; that is, the proper relation between the superior and inferior cusps, the inclination of the cusps, the overbite, and the antero-posterior bite and compensating curve, etc. Comparatively few orthodontists have given much attention to this, which to my mind is largely responsible for the difficulty of movement and the failure to retain teeth in their new position or to provide suitably for mastication when the case is completed.

The advantage of anatomic occlusion applied to orthodontic work was called to your attention some twenty years ago in a paper read by me before this society (here a reference was made to a specific case of a dental student's occlusal relations.)

The essayist referred to a case of excessive overbite corrected by straightening up bicuspids and molar. To one familiar with anatomic occlusion, this appears very simple and causes one to wonder why these principles are not applied to all cases of malocclusion. It is possible to look on irregular teeth merely as a set of artificial ones which are to be "set up" according to the principles of anatomic or normal occlusion.

To become convinced of the possibilities of the rearrangement of irregular teeth it is only necessary to try cutting off the teeth on a plaster cast, obtaining the angle of the condyle path from the head and set them up "anatomically" when it will be seen that

it is possible to arrange any teeth, however irregular, so that they will act with a reasonably normal occlusion.

Normal occlusion allows equal strain to be brought on all of the teeth and the same equalizing which protects a porcelain facing prevents the occlusion from driving a tooth out of position if it is correctly placed, and is of assistance in moving the tooth into its suitable and proper position.

Normal arrangement of the teeth in the arch recognizes anatomical features, including the condyle path, compensating curve, overbites, front bites, inclination of molars, and occlusal position of cusps of superior and inferior; and these things are worthy of much attention from an orthodontist's standpoint.

There may be other ways to check up or determine the "normal" features other than by trial of the side and front articulation, and it is quite possible that the orthodontographic survey is the answer.

Dr. W. H. Gilpatric.—I have previously mentioned that I have nothing to sell nor am I here to demonstrate my mechanical method of applied orthodontia. What I am offering is: means to perform and follow a more intelligent course in the practice of orthodontia. A simple parallel: a physician diagnoses a case with some assurance, he takes into consideration the unexpected and prognoses the case. The orthodontist diagnoses the case empirically and assures the family of the patient that he will do his best, of which there is no doubt. But "his best" is indefinite.

Can it be doubted that having a plan and delineating the proceedings we can not prognose? We can, because we know what the normal arch is, and we know that a number of teeth of a certain size can be arranged on an occlusal line, contact point to contact point, only in a manner that will be normal.

As I have mentioned before, if arranged in any other manner it would quickly show a contracted or expanded arch in the molar region promptly denoting malocclusion and facial deformity. The discussion that preceded, has not in any way attacked the method of prognosis, it simply asserted that it can not be done. Dr. Delabarre asserts that merely to establish occlusion in a malformed arch is not sufficient. Granted, but will he not be helped by knowing when he has established occlusion and normal functioning of the teeth, in passive and active cusp and inclined plane relation? The example of a whole masticatory apparatus being protruded or lowered six inches is absurd. If such a monster would persist in living, his very existence would demonstrate that Nature has accommodated all members for performing their function, and if occlusion could not exist, it could be restored just as correctly so far as the method of predetermination advocated tonight deals with set factors; the sum total of the mesio-distal substance of teeth at contact points. In mixed dentures the table of averages as given by Black has proved so far to be correct, and they form the basis of our measurements for predetermination of the future arch (averages between temporary and permanent).

Regarding the hundred thousand cases to demonstrate my assertions, this is unnecessary and useless. The law of averages clearly established that one hundred cases is a good indication—one hundred individuals taken at random will demonstrate any given premise. I have used my surveys on four hundred cases and the results have been satisfactory, I am, therefore, bound to state, and am convinced, that my conclusions are correct.

Dr. Rogers tells us that the biological factors are the most important in the correction of malocclusion and that as every individual presented for correction shows specific conditions, it would be fallacious to think that an arch could be predetermined as long as the unknown factor causing it can not be found. He also asserts that the patient must be considered as a whole and that his general welfare must be considered, his upbuilding. Medical authorities state that we are not congenitally perfect. Therefore the biological factors have continued to perpetuate themselves in different individuals, in diverse abnormalities of construction and function, in our case, in jaws and teeth; also in acquired habits which may or may not be transmitted.

The orthodontist, while not restricted to orthodontia only, should not perform the offices of a professor of calisthenics with reference to the general welfare of the patient, to establish all the biological factors in the new generation would, in ultimate analysis become a function of the State Department of Health. This ideal condition is desired by all men of science who are striving for perfect society. Surely orthodontia has a great deal to do with the development of the brain by enlarging the sinus, reestablishing normal breathing, correcting and helping the reestablishment of facial lines to produce harmony and symmetry in the individual. The biological factors in a present specific individual are es-

tablished through generations, and if abnormalities are shown as compared to an ideal standard is it not also true that abnormality is nearly normal to that individual inasmuch as it performs its function and that the metabolism is complete?

That brings us to the conclusion that orthodontia has to deal with normality and abnormality only as it refers to functions of the masticatory apparatus and its correlated parts, the muscles of expression, mastication, and digestion. Good digestion and better facial lines are results and not causes of normal occlusion, and the orthodontist need not search for prehistoric changes, inasmuch as the changes are evolutionary and the changes from one generation to another are imperceptible.

Dr. Rogers refers to his specific study, calisthenics of the muscles of the head, and appears to consider this as the paramount factor in orthodontia. This undoubtedly helps, but the predetermination of arch will in no way disarrange his principles; on the contrary, it will help him in knowing much better the direction in which the teeth should be moved in order to reestablish the normal function of the muscle.

Dr. Baker opened his discussion by showing four abnormal arches with their full complement of teeth. These arches were drawn fifty or more years ago by an artist who attempted to represent an idea conceived by an anthropologist, and to demonstrate the contentions of Broca that an abnormal cranium is related to an abnormal arch.

How is it possible for me to predetermine a normal arch from a free-hand drawing?

Some of us are endowed with the gift of mind-reading. I am not, and can not see what Dr. Baker had in mind when he screened four free-hand drawings of abnormal arches belonging to four abnormal heads which did not exist, except in the mind of Broca, and were drawn to illustrate a debatable theory. These drawings have no standing in orthodontia.

Dr. Baker said that science was cold. Science is not cold, it is exacting. It wants the truth in all its relations. Deductions under scientific guise by analysis from imaginary conditions are not scientific. The other slides on the screen demonstrate only how much he can accomplish when he stops in his mechanical pursuit and allows Nature to take the case in hand and finish it for him. As Dr. Rogers remarked the muscles of the face were not in normal relation and functioning so as to give the patient a normal face.

In conclusion I will state that I stand ready to demonstrate the soundness of my principles through a test with finished cases and Nature's normal arch, said cases to be furnished by your committee.

The models of the cases shown are in my office, and open to inspection at any time.

WHAT ARE WE DOING TO JUSTIFY OUR EXISTENCE?

By C. H. Juvet, D.D.S., Ottawa, Canada

TO repay the heritage that is ours to cause posterity to feel thankful that we passed through the cycle of existence."

This quotation from a letter published in *Dental Items of Interest,* November, 1918, I consider well worth the serious consideration of the members of the dental profession.

In assuming the responsibility for the preparation of an article on the subject of orthodontia, it has not been my intention to presume to tell you anything you do not already know or have not already learned, but to refresh your memory, and endeavor to draw to your attention the importance of a greater interest in the department of orthodontia by the members of the profession of dentistry, and also, to impress on you the importance of advising parents of the necessity for the correction of abnormalities early in life, so as to obviate complicated treatment which is sure to follow when cases are neglected until such time as all the permanent teeth have erupted.

When the subject of prevention is being given so much consideration, it might not be out of place to inquire how much thought is being given to preventive orthodontia.

How many of the members of our profession are able to tell a normally developing arch of a child of, say, six years of age, and one that is not developing normally?

Dr. E. A. Bogue of New York City has carried on investigations on this subject for a number of years, and he published the results of these findings in the *Dental Digest* in 1912-13 in which he says, if at six years of age, the temporary, or baby teeth, still remain perfectly regular and close together, the prognosis is clear that the permanent teeth, which are to succeed these regular baby teeth, will inevitably be irregular.

Dr. Bogue further states that the normal child at three and a half years of age should have an upper dental arch of at least 1.10 inches lateral width in the temporary molar region. He also states that if at four or five years of age the temporary dental arch in the molar region is not more than 1.10 inches wide, the diagnosis is positive that there exists an arrest in the child's development which it will not outgrow unaided.

The results of Dr. Bogue's findings should be carefully studied by the members of the dental profession so as to be able to distinguish normal development from the underdeveloped cases of children coming under their observation every day.

Members of the medical profession, as well as the dental profession, have many children under their observation every day who are not advised of the necessity for early treatment as often as they should be.

Parents are presenting themselves almost every day with the information that they had applied for the correction of a noticeable irregularity when the

child was quite young and were advised to defer the treatment until the child was older or until all the permanent teeth had erupted. If the members of the profession who give this advice were willing to assume the responsibility for the correction of these deferred cases, it would not be so important; but, when neglected until the case has assumed such proportions or difficulties as to be almost impossible of correction, parents are then informed that the patient has reached a suitable age, or perhaps, as it more often happens, the parents take the matter into their own hands and seek the advice of someone else who

Fig. 1.

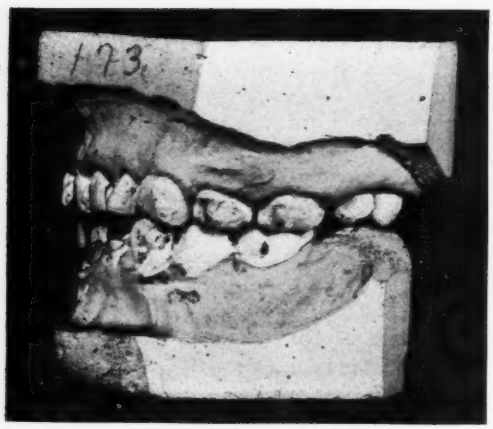


Fig. 2.

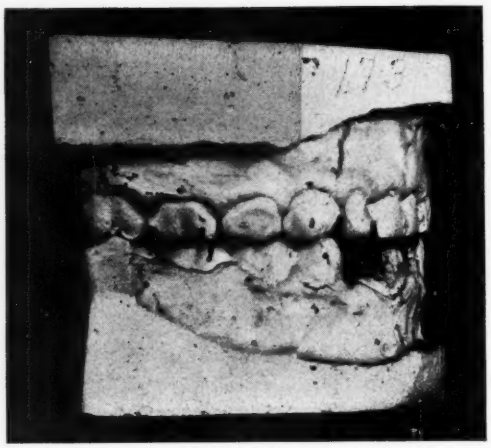


Fig. 3.

then has the painful duty of informing these patients that, being responsible for the treatment and results, he would have much preferred to have undertaken the treatment at a much younger age, as he would then have been much more assured of a permanent result than can be expected at the patient's present age. The advantage of correcting cases in younger children is that when treated young there is no abnormality present in the majority of cases, but simply a lack of development of the arches which is often very readily overcome. If treatment is delayed until the patient reaches the age of twelve or fourteen, there is an abnormality to correct, and the muscles and features have been so influenced by the underlying tissues, that the abnormal action, like a bad habit,

long persisted in, is harder to overcome. If the members of the profession would only get the idea fixed in their minds that in the majority of cases we are not correcting irregularities of the teeth, but underdevelopment of the arches or jaws and that the teeth are only used as a means to an end, and dealing with bone tissue as we are, would appreciate the fact that bone tissue is much less resistant at seven years of age than it is at twelve, it would help very materially in getting the proper view and the desired results.

When this point is understood and firmly fixed in the minds of our profession, we will see fewer irregularities or hideous specimens of neglect walking the streets of our cities. We can conscientiously say that a great many of these

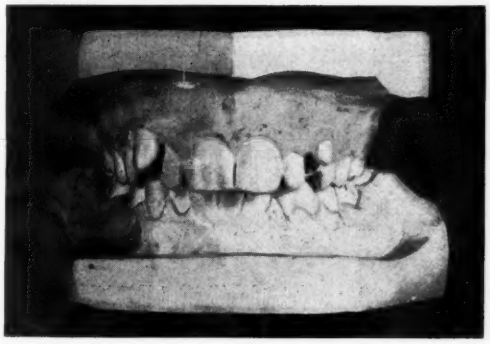


Fig. 4.

Fig. 5.

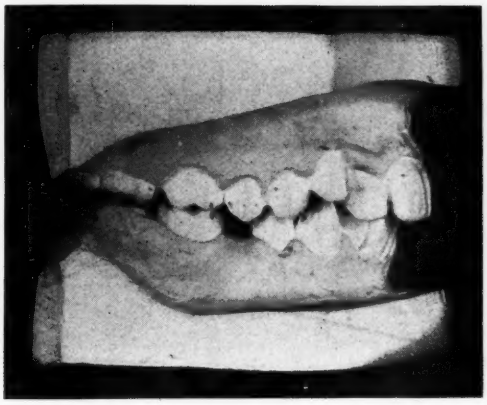


Fig. 6.

conditions could have been prevented if the members of the profession had taken a greater interest in orthodontia and had realized the responsibility of their position and the duty they owe their little patients in pointing out to them these defects early in life so that they might have them corrected while the opportunity for correction is possible and assured. The members of the dental profession should shoulder their responsibilities, and not wait for the other fellow to do it for them.

Figs. 1, 2, and 3 are the front, and right and left side views of casts of a boy taken at 7 years of age. The right and left lower central incisors and right lateral incisors have been lost, and the two permanent central incisors are erupting

in their places, but of such proportions that they almost entirely fill the space previously occupied by the three temporary incisors.

One will also notice that there has been no development taking place to accommodate the larger or incoming second teeth, as there is no separation or spacing of either the upper or lower teeth. One will also notice a normal mesio-distal relation, or neutroclusion. Figs. 4, 5, and 6 are casts made of the same mouth at thirteen years of age where one will notice that there is a unilateral distoclusion on the left side and a tendency to a similar condition on the right side which I firmly believe will have resulted when the left upper cuspid further erupts.

Fig. 7.

Fig. 8.

Figs. 7 and 8 are palatal views of the same case at seven and thirteen years of age.

Measuring between the temporary molars at the gum margin of the model shown in Fig. 7 was found to measure 1.04 inches at seven years of age when he should have had a development of at least 1.10 inches at four years of age.

When the model shown in Fig. 8, which is a cast of the same case at thirteen years of age, was compared with that shown in Fig. 7, it was found that there was a development of 1.14 inches, or only .04 of an inch development more than he should have had at four years of age.

As already expressed, in the majority of cases presenting early in life, there is only a lack of development to contend with, whereas if the case is left

until later in life, or until the child has reached the age of twelve or fourteen complications arise such as the distoclusion presented in this case, and I have every reason to believe that if this case had been treated at seven, this condition would not have developed, and it would have been easily corrected by simply stimulating a normal development.

This conclusion is formed from the fact that the boy has only been wearing appliances for about six months, and I have only seen him three times, or, rather, modified his appliances three times, and the lower jaw is moving forward into normal occlusion without any other influence being exercised than a stimulation or expansion to normal development.

Figs. 9 and 10 are lingual comparisons of the same case at seven and thirteen years of age. These illustrations should be sufficient to demonstrate

Fig. 9.

Fig. 10.

to any one the necessity for early treatment in these underdeveloped cases, and the complications likely to arise when early treatment is not undertaken.

Prevention, rather than a cure, is quite as applicable to mouth conditions as other parts of the body.

It is, therefore, important that the general practitioner should be possessed of sufficient knowledge in the department of orthodontia so as to be able to distinguish between an arch that is developing normally so as to be of sufficient proportions to accommodate the larger incoming second or permanent teeth and one that is not properly developing.

If the members of the profession can be brought to a realization of the responsibility that is theirs, the purpose of this short article will not have been in vain.

HISTORY OF ORTHODONTIA

(Continued from page 544, Vol. IV)

By Bernhard Wolf Weinberger, D.D.S., New York City.

EUGENE S. TALBOT, M.S., D.D.S., M.D., D.Sc., L.L.D. 1847.—In the *Dental Cosmos* of 1881 we find the first article on *The Regulation of Teeth by Direct Pressure,* written by Talbot. From that time until the present, his articles are scattered throughout the dental and medical journals, those presented before societies prior to 1888 were incorporated in his first work—*Irregularities of the Teeth.* This book has passed through some half a dozen editions and a great deal of material which is included was never presented in the dental journals or before societies.

Fig. 1.—Eugene S. Talbot, M.S., D.D.S., M.D., D.Sc., LL.D.

Talbot's (first edition) work while covering the usual subjects of anatomy, etiology, development, etc., included some subjects heretofore but slightly treated. He aproached the question of etiology of malocclusion from a standpoint not previously known and in the fourth edition we find the following:

"The unwritten law in general medicine, 'that to know the cause is half the treatment,' is also applicable in the treatment of deformed jaws and irregular-

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ities of the teeth. Without the knowledge of etiology no one can successfully correct deformities as is evident in the many failures by men who profess to make this a specialty."

He has confined himself entirely to his own appliances and methods of treatment. "Systems" in the ordinary charlatan-like sense are not accepted as guides. In the author's opinion the practitioner should be familiar with the etiology of the case in hand; his knowledge of principles and mechanics should suggest to him the most suitable appliances for the given case. Every force has its place in the treatment of these deformities.

In the second edition we find the following:

"Health of the body, like that of the mind, depends largely on the proper performance of the various bodily functions. The kind and degree of functional activity must be suited to the individual. When this accord exists we have happiness of mind and health of body. In a recent article in a medical journal, the baleful influence of idleness in prison life is discussed. It is stated that the consequences of the labor law of 1888 were the increase of insanity, a higher death rate, a shattered morale and an unprecedented deficit in the sum total of earnings as compared with expenditures. This illustrates a far-reaching principle. Not only is activity necessary to the well-being of the individual as a whole, but to every organ. Excessive action or impaired function imply disease. The stomach, if overloaded or required to digest unsuitable food, becomes enfeebled. Every organ depends for its integrity immediately on the nervous system. When nervous activity is impaired or lacks balance, the general balance of function is disturbed. Nowhere are results of this lack of equilibrium more visible than in the teeth.

"Malnutrition resulting from disease, from insufficient or unsuitable food and unhealthy environment, is the cause of idiocy, insanity, blindness and other defects. Derangement of the nervous system usually underlies these conditions as found among the poor. But there is another class of individuals who suffer from neurotic conditions. They are those who are well fed and housed, but have overtaxed their nervous systems by improper modes of life and various forms of excitement. The two classes have this in common, that the functions of the nervous system are impaired, and they show similar results of defective nutrition. This want of balance produces an osseous system that shows excessive development in some of its parts, and arrested development in others. Nowhere is this more manifest than in the maxillæ. Thus we have the causes of constitutional irregularities established. We see the disturbances of the functions of the organs of the body as a whole result in constitutional irregularities. The impairment of the function of the teeth themselves gives rise to local irregularities. The importance of the correct performance of the function of these organs will be seen from a brief consideration of the results of the impaired activity.

"1. Teeth to be clean must be used. When one-half of the arch alone is in use, the other half shows an unusual deposit of tartar, with hypertrophy of the mucous membrane and gums.

"2. The development of the alveolar process depends on the use or disuse

of the teeth. When the bite is too close in the posterior portion of the arches, an effort is often made by Nature to correct this by lengthening the process in the anterior part. Cases of anterior protrusion afford study of these conditions. When forced to perform an abnormal function in these cases excessive development results.

"3. Not only does the alveolar process lengthen when not in use, but individual teeth elongate as well when deprived of their antagonists.

"4. Nowhere does interrupted function produce more mischief than in the derangement of articulation. The function of every individual tooth is indicated by its form. This shows that it should touch at certain points and antagonize at others. There is a certain degree of motion perceptible only by its effects. When the support of a tooth is withdrawn by the extraction of its neighbor, this motion is no longer sufficiently restricted, and there is more or less migration or tipping. The basilar ridges of the anterior teeth, and the cusps of the posterior, are resting-places for their antagonists. Let this support be taken from one or more teeth, and their function is destroyed in part and their health impaired."

In order that our readers have some idea of the scope of this volume a portion of the contents of the fourth edition is given: Seventeen pages are devoted to History, followed by Heredity, Congenital Factors and Maternal Impressions, Post-Natal Skull and Jaw Development and Periods of Stress, Development of the Cranium and Face, Development of the Jaws, Development of the Alveolar Process, Development of the Vault, Development of the Peridental Membrane, Development of the Teeth, Social Consanguinity, Near-Kin, Early and Late Marriage, etc. The practical subject, which includes appliances, is not reached until the last chapter, under the head of Surgical Corrections, and this covers forty-four pages. It will thus be seen that the author has not regarded as of much importance the mere description of cases or the preparation of appliances used.

In the chapter on the Development of the Jaws, this curious fact is stated presumably on exact measurements. "The lateral diameter of jaws of existent races in Europe is greater than of the same races in America. * * * The jaws in older parts of the United States are smaller than jaws in the newer. The differences between jaws of the residents of Boston and those of Chicago are thus in evidence. Presumably it is to be inferred that the farther west the child is born there will be a proportionate increase in the diameter of the jaw; a discouraging fact, if it be a fact, for those born on the Pacific coast, as they will rapidly develop into the large jaws of the American Indian."

The author discards "dome," "palate," and "arch," in speaking of the roof of the mouth and adopts the word "vault." This includes the hard palate, the soft palate, and the alveolar process.

Though Dr. Talbot may not have made great contributions to orthodontia from the mechanical treatment of irregularities, his extended researches of over forty years have, however, produced results which have had a great deal of influence in advancing both the science and practice of our specialty. Along the line of evidence of maldevelopment, Talbot observed that which he called degeneracy but undoubtedly in the future will be recognized as disturbances of

the internal secretory glands. Of his own devices he described and illustrated his coiled springs, jackscrew, etc., for expansion of the arch or for movement of the individual teeth. He also advanced and advocated surgical correction by removal of the alveolar process and tissue in the path of moving teeth.

Returning to the journal articles of Talbot in 1881 we find him using the jack-screw as shown in Figs. 2, 3, 4, and 5, the use of which he describes in the following manner:

"I secured a jackscrew of the proper length firmly to the canine upon the right side, allowing it to come in contact with the tooth I wished to move—the bicuspid of the opposite side. When this was forced laterally sufficiently, I removed the nut on the end of the screw and replaced it with a wedge, which

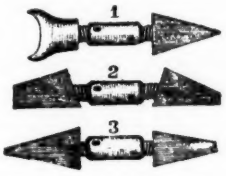

Fig. 2.—Jack-screws as described by Talbot.

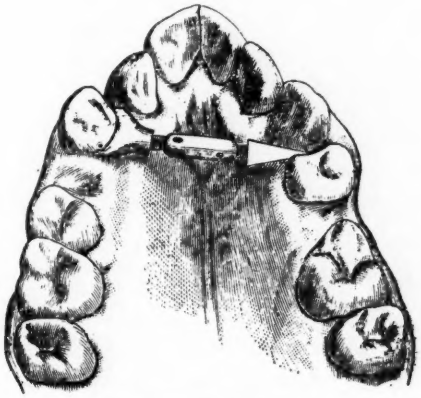

Fig. 3.—Jack-screws applied to a case.

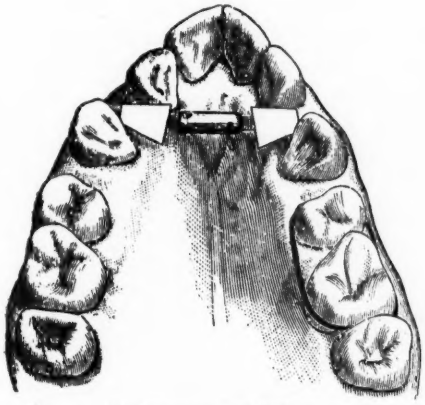

Fig. 4.—Jack-screws applied to a case.

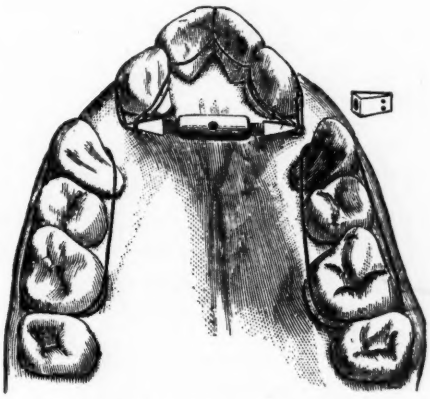

Fig. 5.—Jack-screws applied to a case.

was inserted between the bicuspid and the canine. The canine being firm and inflammation having been already produced around the bicuspid, it yielded readily to the powerful pressure of the screw and wedge. When this had proceeded as far as possible, the wedge was removed and a thicker one substituted. As soon as the tooth reached the molar, it was secured to it by ligatures and so held in place. I fastened my jackscrews firmly to the canines and forced them laterally until inflammation set in. Wedges were put upon either end of the screw, inserting them between the canines and lateral incisors. The laterals being solid, acted as fulcrums, and the canines were easily forced into place.

These were then fastened by ligatures. To move the lateral incisors I employed a short screw with wedges, in which holes had been drilled. To each central I tied a linen thread, carrying it around the lateral, over the end of the wedge on the screw, and passing it through the holes, tied it fast. By turning the screw the laterals were not only forced outward, but were rotated in their sockets. When this was accomplished, I fitted a plate to retain the teeth in place and also to draw the centrals back into the arch. This was done by running a piece of gold wire across the labial surfaces of the centrals, from which a rubber band was carried posteriorly to a loop in the rubber plate. As soon as they reached the proper position, another plate was inserted with a gold band passing over the outside of the teeth to hold them in place."

In the *Dental Cosmos* for May, 1885, Talbot introduced coiled springs under *Dental Regulating Apparatus,* as follows:

"In many operations designed for the regulation of teeth, one of the first and most difficult things to be done is the spreading of one or both of the dental arches, and usually much time is consumed in efforts to obtain a fixed point from which movements may be made. The jackscrew is a positive and simple device, but it can not be used from side to side of the inferior maxilla because of the intervening tongue; it also interferes greatly with vocal articulation, if so adjusted as to span the palatine arch, and as the majority of cases to be regulated are those of children in attendance at school, they must thus be either kept out of school or be subject to great annoyance from the jackscrew impediment.

"The Coffin cleft plate is an improvement in comparison with the jackscrew, but likewise interferes with the tongue if used on the inferior maxilla; and when applied to the superior maxilla the complex character of the spring makes the fixture difficult to adjust in such relations that the expanding force shall be exerted in directly opposite directions, the spring having usually a tendency to thrust the plate out from the mouth; and, in cases where the teeth are not fully erupted, it is extremely difficult to retain such plates in position.

"An appliance by which I have obtained the most satisfactory results, with a minimum of hindrance or discomfort to the patient, will be described with reference to the accompanying illustrations.

"One appliance shows a spring made of piano wire, coiled three times around a mandrel of the same or a little larger wire, and then bent down so that the arms will be in the same horizontal plane.

"On an exact plaster model of the case to be regulated a thin, narrow vulcanite plate is formed, with a short vertical post fixed, either before vulcanizing or afterward by drilling, centrally in the plate on the median line. Grooves or slots are, with a wheel bur, cut in the sides of the plate to receive the ends of the spring and prevent its displacement after the coil has been placed on the post. Fig. 6 represents such an appliance in position on a plaster cast of the inferior maxilla, and it will be thus seen that the movements of the tongue would not be, as in practice they were not, seriously restricted. For the superior maxilla the plate is of like construction, and in some instances may be ligated to the teeth. The tension of the spring is changed by simply bending outward or inward its arms, and in many cases the apparatus may be inserted

or removed with great facility, and its action be so continued and controlled that the required expansion may be obtained and maintained by the use of but one plate. In occasional instances the plate may be dispensed with, and by the judicious use of ligatures the spring-arm may be attached directly to the teeth to be moved, while the coil is likewise fastened to the front teeth."

Fig. 6 is taken from his article, *Spreading the Dental Arch, Cosmos,* 1886, page 19, and is a modification of his previous regulating apparatus and needs no further description.

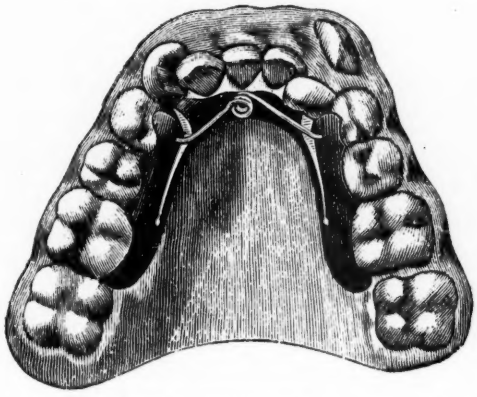

Fig. 6.—Plate vulcanite, with coil in place.

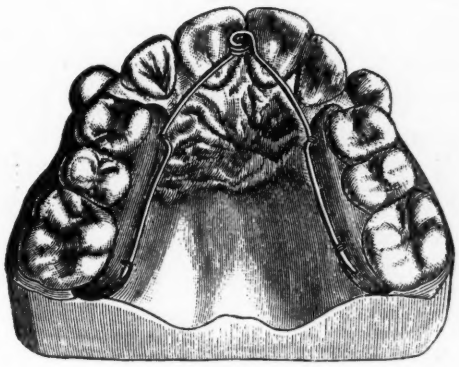

Fig. 7.—Appliance for expanding superior maxilla.

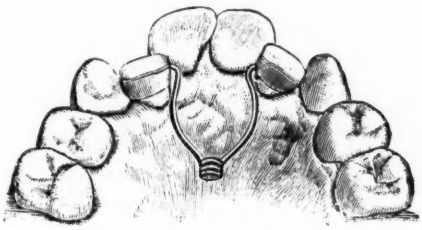

Fig. 8.—Expanding the superior lateral.

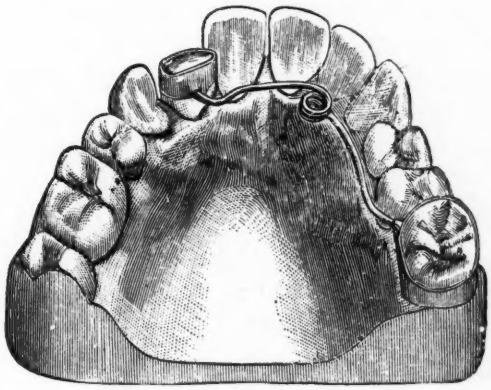

Fig. 9.—Method of moving individual teeth by coiled spring.

Fig. 7 is to be found on page 97 of the same journal, while Fig. 8 illustrates Talbot's method of expanding the superior laterals. .

"Thin platinum collars were made to fit the laterals, on which, after drilling a hole in the side of each collar, they were firmly fixed with oxyphosphate of zinc. A Norton-Talbot spring was bent into the form shown, the ends of the arms being turned at a sharp angle and cut short as seen in the figure.

"The spring was then put in place, the arm ends entering the holes in the collars, and the curved arms found to be so closely conformed to the surface of the gums and palatine parts that the fixture was no obstruction to occlusion, and yet could be easily sprung out of position for cleansing purposes or for increas-

ing the expansive power of the spring, by simply widening the lateral spread of the arms.

Fig. 9 shows another method of moving individual teeth.

"To force out central and lateral incisors, I have found the following methods useful: Around the tooth to be moved, and around the molars as nearly opposite the direction the incisor is to travel as possible, fit platinum collars. Solder cups upon the collars directly opposite and in line. Make a spring of piano wire, and spring it into the cups soldered upon the collars."

In regard to the extraction of the sixth-year molar, Talbot in the *Items of Interest* for 1888, page 12, says:

"If the temporary teeth are extracted, the first permanent molar will work forward and fill the space intended for the bicuspid tooth. In other words, the central incisor, lateral incisor, cuspids, temporary molars, and the six-year molar, will all be in the jaw. If at the same time, from decay or other cause, the second temporary molar is removed, the first permanent molar will work forward and fill the space of the second temporary molar.

"This will be better comprehended when you go home and examine the models and mouths of your patients. It will be seen that if the teeth have been removed on one side, the molar has worked forward from an eighth to a quarter of an inch, or as far as the crowns of the bicuspids. I have tried it time and again and it is invariably the same. If you will take your rule and measure from the middle line to the anterior surface of the first permanent molar, you will find that the space is narrower from the middle line to the anterior point of the first permanent molar by an eighth of an inch than on the other side of the jaw where the temporary molars are in place. When we consider how many of the temporary teeth are prematurely extracted, we need not be surprised at the number of irregularities of the teeth. It is quite common to find this condition.

"In regard to the extraction of the sixth-year molar, I do not believe in the extraction of any teeth except in extreme cases. If we have the first permanent molar decayed to such an extent that the pulp is dead, and the roots are not properly formed so that they can be filled, that tooth should be removed. In some cases this will correct the irregularity, but will not serve for all, because the permanent teeth have a tendency to work forward to fill the spaces so that the other teeth can not come through.

"Another irregularity which is quite common is where the permanent cuspid has pointed up on the outer side of the alveolar process. It is quite common to find the first bicuspid tooth worked forward to such an extent that the permanent cuspid can not come down into place, and the cause of that is extracting the temporary cuspid tooth. Then often, if the arch is large, I agree that the first bicuspid should be removed, that the cuspid tooth may come down into position."

It is in the July number of the *Cosmos*, 1888, that we find Talbot seriously considering the *Etiology of Irregularities of the Teeth.* He treated the causes under the following sub-heads: *Arrest of Development of the Superior Maxilla.—Consanguinity in Its Relation to Deformities in General.—Scrofula.—*

Drunkenness in Parents.—Pre-Natal Influence and Intra-Uterine Education.—Report of Cases of Arrested Development and Excessive Growth of All the Tissues, in Connection With Idiocy, Imbecile and Feeble-Minded Children.—Abnormally-Shaped Heads, and concludes his article with this rèsumé:

"1. Irregularities of the teeth can not be justly said to be of congenital origin, since they do not exist at birth.

"2. Irregularities of the teeth can not occur until they have erupted, and thus show their relation to each other and to the jaw.

"3. Irregularities of the teeth which I have denominated constitutional prevail to a greater extent among the idiotic, deaf and dumb, and blind, than among an equal number of strong and healthy persons.

"4. It may be seen that not only is the brain matter deficient in the feeble-minded, but, as I have noted, many cases are seen which demonstrate that the osseous system is also generally defective.

"5. Arrest of development is the result of malnutrition during embryonal and infantile growth, influenced by consanguineous marriages, scrofula, drunkenness in parents, prenatal influences, intrauterine education, and constitutional diseases, or of inflammation of the osteophytic membranes in utero.

"6. Irregularities of the teeth do not exist among normal or large jaws, while among those who have abnormally small jaws, the majority have irregular teeth.

"7. When premature ossification of the sutures at the basis cranii takes place, the anteroposterior diameter is shortened, producing arrested development of the superior maxilla.

"8. When the bone tissue is arrested in development from malnutrition, the maxillary bones are also affected.

"9. When arrested development of the superior maxilla occurs the face often presents a sunken appearance at the angle and root of the nose, with the nose broadened and the inferior maxilla prominent.

"10. In another paper I shall attempt to prove that the irregularities of the teeth called constitutional are the result of small maxillæ, and that Dr. Hammond's future man will not only lack hair and teeth, but the superior maxilla will gradually decrease in size and eventually become rudimentary."

This article was continued under the following subheads:

"Arrest of Development of the Maxillary Bones Due to Racecrossing, Climate, and Soil.—Climate and Soil. (Subhead II, page 533.*)*

"From the foregoing it seems legitimate to draw the following conclusions:

"1. The same influence which produces the small jaw in the idiot, deaf and dumb, and blind, will also produce the small jaw in strong-minded individuals.

"2. Heredity and conditions of life can give rise to a variety, and as the individual that has begun to deviate from the type becomes in its turn apparent, tending to transmit to its offspring the exceptional characters that distinguish it, the variations become more marked in the offspring, and heredity transmits the sum of these variations to the following generation.

"3. Irregularities of the jaws and teeth are not found in pure races nor in aborigines.

"4. Irregularities of the jaws and teeth are common in mixed races, and more common in the offspring of races differing widely from each other.

"5. Such irregularities are not the result of high and selective breeding, since such breeding obtains only in pure races and aborigines, in which the irregularities are not found.

"6. Conditions of life, climate, soil and food play an important part in irregularities of the jaws and teeth, when taken in connection with race-mixture.

"7. In older parts of new countries in which a number of generations have lived, small jaws and irregularities of the teeth are more numerous than in the newer parts of new countries.

"8. The shape as well as the size of the head has much to do with the shape of the jaw.

"9. The prognathism of the jaw increases with the age of the individual. It is, however, sometimes a natural growth, as noticed in the negro, and is characteristic of that race. In the American race it is due mostly to local causes."

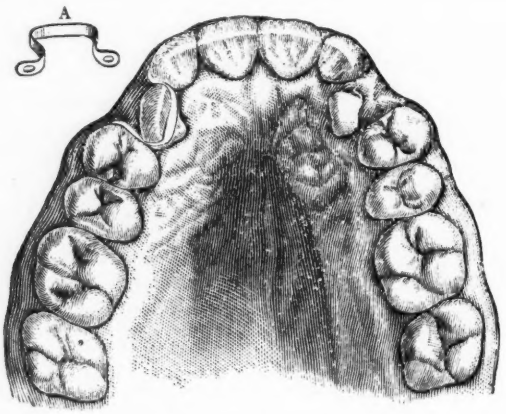

Fig. 10.—Method for compulsory eruption of cuspid.

"Arrest of Development and Excessive Growth of the Maxillary Bones." (Subhead III, page 630.)

"Development of the Inferior Maxilla by Exercise, and a Symmetry of the Lateral Halves of the Maxillary Bones." (Subhead IV, page 693.)

"Asymmetry of the Maxillary Bones." (Subhead V, page 783.)

"The Alveolar Process.—Hypertrophy of the Alveolar Process." (Subhead VI, page 876.)

Dental Cosmos, 1889, *"The Origin and Development of the V- and Saddle-shaped Arches, and Kindred Irregularities of the Teeth."* (Subhead VII, page 1.)

"The Origin and Development of the V- and Saddle-shaped Arches and Kindred Irregularities of the Teeth." (Subhead VIII, page 98.)

Under *Compulsory Eruption of the Teeth, Dental Cosmos,* 1889, page 352, Fig. 10, explains Talbot's methods. Fig. 10 shows an appliance made of German silver, which possesses all the requisite qualities. I have three thicknesses of it ready for use, Nos. 29, 31, and 32, U. S. gauge. Strips are cut one-sixteenth to one-eighth of an inch in width, according to the strength required, and bent

with small round-nosed pliers into the shape represented at *A*, to fit the teeth. This is removed "every day, and with round-nosed pliers the ends are bent, the springs shortened, and forced to place upon the tooth. This little spring acts in two directions: (1) to carry the teeth laterally and thus provide room, and (2) to draw the irregular tooth into position. This appliance can only be used when the crown of the irregular tooth is fully erupted. Teeth situated outside the arch may thus be brought into line as well as those which are situated inside. In the latter case it is necessary to wear a plate to keep the jaws apart while the tooth is in transit."

In 1889 *Cosmos,* page 762, Talbot introduced a *"Classification of Typical Irregularities of the Maxillæ and Teeth."*

"All irregularities of the maxillæ and teeth may be traced to the following causes:

"I. Constitutional: malproportion and malrelation of the maxillæ due to excessive or arrested development.

"II. Local or circumstantial:

(1) Improper occlusion;
(2) Want of accord between waste and repair;
(3) Neglect of function.

"These causes are deviations from the general laws that govern the healthy relation and function of the teeth:

1. A proper relative size of the organs of mastication;
2. A proper occlusion of the teeth;
3. Accord between the processes of waste and repair;
4. Proper functional activity.

"These form the basis of the classification adopted."

In the *Dental Cosmos,* 1890, page 185, Talbot wrote the following: *On Making a Diagnosis of a Case of Irregularity.*

"Irregularities have been divided into constitutional and local: the former affecting the body of the bone, the latter being accidental, affecting the teeth and alveolar process.

"Frequently when a case of irregularity is presented we can tell by the general contour and profile of the face whether the case is one of the constitutional or local type, the external proportions being affected by a decided V-shaped arch, excessively developed alveoli, or underhung jaw. One of the first things a dentist has to learn is to observe carefully. In determining the correctness or incorrectness of the outline of the mouth and jaw, he instinctively takes it in as a whole, on the same principle that when we look at the picture of a friend we decide at once whether it is a good likeness or not, reserving our judgment on particular points until later.

"Observe each jaw. See whether it has a normal outline or whether it belongs to the V-shaped or saddle-shaped variety; this will help you to decide about the appliance to be used.

"Now comes the important feature of a correct diagnosis. Examine the

occlusion, letting the patient open and close his mouth slowly. No detail must go unnoticed. The beginner should familiarize himself with the individuality of each class of teeth both as to outline and occlusion. For this purpose he is advised to study the very excellent article by Dr. E. T. Starr and F. L. Hise, in the August number of the *Dental Cosmos,* vol. XXXI.

"When there is an asymmetry of the upper and lower jaws, one being larger than the other, the occlusion from the cuspid back is usually wrong. In such cases it generally strikes in front of the lower cuspid instead of between it and the bicuspid, disarranging the articulation of every tooth back of it. We can not stop here to speak of the different forms of malocclusion; the dentist who never ceases to be a student will see these for himself.

"The difficulty in local irregularities is usually easily detected, for it is found either in the alveolar arch or in the malposition of individual teeth.

"Before giving your opinion, inquire into the family history. Dr. Kingsley justly remarks that it is useless to try to correct an irregularity peculiar to a family type: nature reverts to her original design notwithstanding long-continued efforts. For this reason it is usually well to wait until the patient is of an age when it can be determined what permanent form the jaw will assume.

"When the arch is overcrowded and can not be spread, or when it protrudes and the extraction of one or more teeth appears advisable for the purpose of obtaining space, care should be exercised in deciding upon the right ones. Examine to see which teeth are carious or diseased. Do not extract a first molar if it can be preserved with comfort to the patient. The cuspid is the most important tooth in determining the outline of the wing of the nose and upper lip and giving character to the face; for this reason never remove it when avoidable.

"Eighteen years of experience in the correction of irregularities of the teeth and a practical knowledge of the laws of mechanics have taught me not to rely on any particular appliance. Frequently, though a certain appliance has worked well in one case it may not be efficient in another case of a similar nature, and not infrequently two or three of the different forces are tried before one shows itself effective, this being due to the unknown factor of resistance which can be determined only by experience."

In the conclusion of his paper, entitled *The Differentiation of Anterior Protrusions of the Upper Maxilla and Teeth,* Talbot says:

"It will be seen from a comparison of these six forms of anterior protrusion, that the phenomena that strike the casual observer as very similar are due to what I have termed constitutional causes, that is, an ill-balanced osseous system; the last is generally ascribed to diathesis, while the four remaining forms are accidental. In the first form the osseous system is affected, in the rest the alveolar processes and the teeth. Owing to these facts, in only the first form does the lower maxilla partake of the defect, while in the rest its form is independent,—that is, it may be normal, or subject to excessive or arrested development. For the same reason only in the first case is the facial angle affected by this irregularity.

"In the first form the osseous portion of the upper maxilla is the force,

while in the rest the alveolar process and teeth. The bite varies with the cause, but is defective in every case. The gums are necessarily affected in the last. The features that these irregularities have in common are anterior protrusion and defective bite, varying in every case, but affecting the appearance of the patient in proportion to extent and duration. A diagnostic distinction of these irregularities is absolutely necessary to the determination of the methods used for correction. An upper jaw, the osseous plate of which is abnormally developed, with a normally developed alveolar process and teeth, is practically hopeless, while those forms in which the teeth and processes are abnormal are the proper field for the efforts of the practitioner. It would be useless to attempt the correction resulting from malocclusion due to the loss of posterior teeth by appliances that would be effective in the correction of the V-shaped arch, while a protrusion resulting from an excessive deposit of bone-cells requires entirely different treatment.

"Failures in the correction of irregularities are largely due to a want of recognition of etiologic differences. There is no department in dentistry that affords more interesting study to the etiologist than these cases, inviting careful observation and subject for thought in every instance."

In this work it will be impossible to review all of Dr. Talbot's articles on account of lack of space. A few of the titles of his articles and where to find them are however included: *Dental and Facial Evidences of Constitutional Defects, International Dental Journal,* 1896, pages 261-286. *Teeth Irregularities and the Surgical Correction, Dental Cosmos,* November, 1896, page 907. *Degenerate Jaws and Teeth, International Dental Journal,* 1897, February, March and April numbers. *Etiology of V-shaped Arch, Dental Cosmos,* 1897, November, page 927. *Etiology of Irregularities of Jaws and Teeth, Cosmos,* 1898. *Deformities of the Dental Arch, Journal of the American Medical Association,* Chicago, 1898. *Degeneracy—in Its Relation to Deformities of the Jaws and Irregularities of the Teeth, Cosmos,* 1898, September, page 734. *Unilateral Jumping the Bite, International Dental Journal,* 1901. *Deformities of the Jaws Among the European Degenerates, Dental Summary,* Toledo, 1904.

In the *Dental Cosmos* under *Teeth Irregularities and Their Surgical Correction,* 1896, page 907, Dr. Talbot wrote the following:

"Density of bone often makes it very difficult to obtain sufficient force to produce the absorption of this tissue required to bring the teeth back into place. Probably one of the most difficult operations is to carry back a cuspid, which is erupting in the vault of the mouth, back into its normal position. This not only requires considerable force, but time, to say nothing of the difficulty in attaching a cap for a point of resistance. Rotation of the teeth, especially the incisors and cuspids, is frequently difficult, if not impossible, owing to insufficient leverage.

"For seventeen years I have adopted surgical treatment, but have not made public my methods, since incidental conversation with some of the best men from time to time revealed that they had not taken kindly to it. I therefore wished to give it sufficient trial before recommending it to the profession. I have met with such markedly uniform success that I do not hesitate to recommend it to all practitioners as perfectly safe and reliable with the antiseptic

care required in surgical operations. This method consists in removing entirely the alveolar process in the line of travel of the tooth to be moved, leaving a small amount of process about the root of the tooth, holding intact the peridental membrane. This is accomplished with coarse-cut revelation burs, or those that will cut in all directions. They can thus be used as drills in certain conditions to be mentioned later on.

"If the cuspids require to be carried backward, make an appliance with

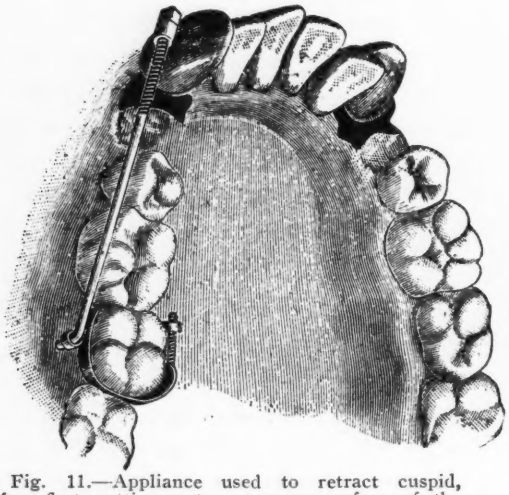

Fig. 11.—Appliance used to retract cuspid, after first cutting out a concave surface of the alveolar process.

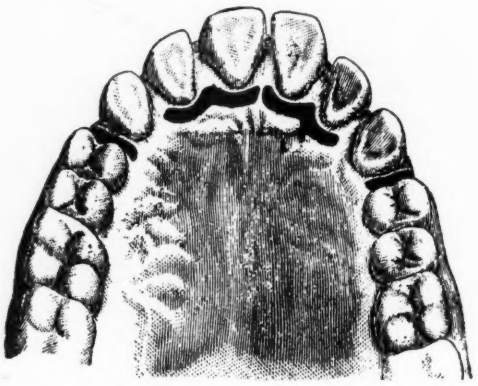

Fig. 12.—Concave surface removed from palatine surface.

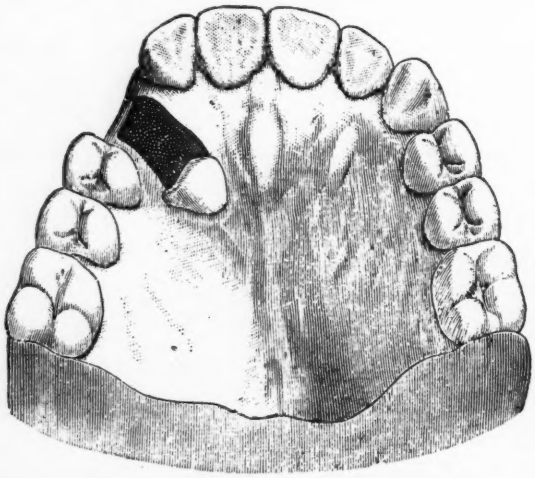

Fig. 13.—Moving cuspid forward after portion of surface has been removed.

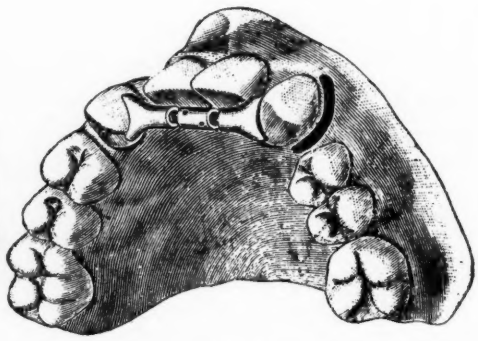

Fig. 14.—Method used by Talbot to increase space between cuspids.

bands about the first and second molars, with cap upon the cuspids and a bar with a screw and nut upon the end, as recommended by Dr. Farrar. Extract the first bicuspid, and adjust the appliance with a sharp new bur dipped in five per cent carbolic acid or one per cent corrosive sublimate or listerine. Then resting the hand against the cuspid, cut out the palatine and buccal V-shaped plate, making a concave surface of the alveolar process, as illustrated in Fig. 11. If the superior incisors are to be carried back, cut semi-circular spaces just

posterior to the teeth to be moved (Fig. 12). To carry a cuspid into place which is erupting into the vault of the mouth, remove the alveolar process in the direction of the line of travel. (Fig. 13.)

"In moving teeth laterally by a jackscrew, it will be found that not infre-

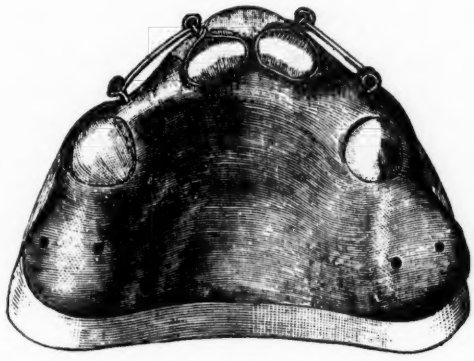

Fig. 15.—Appliance for "pulling out the central incisors," using the coiled springs in the vulcanite.

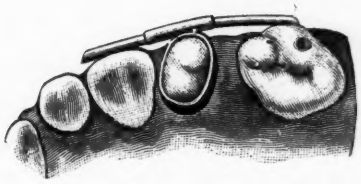

Fig. 16.—Method of retention used by Talbot.

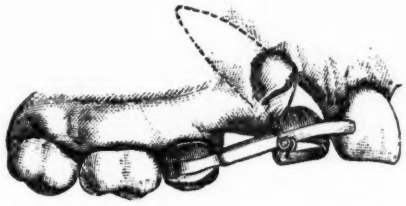

Fig. 17.—Method of causing the eruption of teeth.

Fig. 18.—To increase the space for the second premolar.

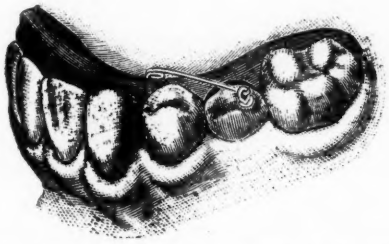

Fig. 19.—Coiled spring inserted in an eye attached to the tooth to cause the eruption of the premolar.

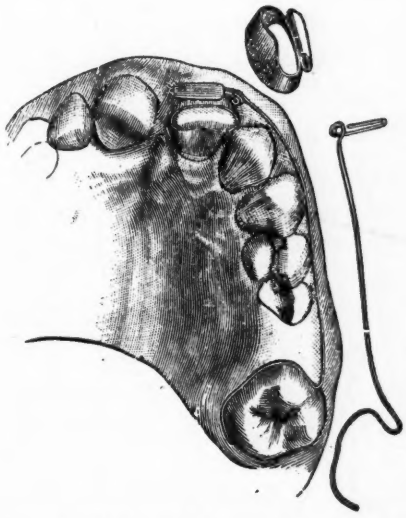

Fig. 20.—Method used to rotate a central incisor.

quently one tooth moves faster than the other. To bring both to their proper position cut out the alveolar process on the side of the slowest-moving tooth, and both will come into proper position. (Fig. 14.) To rotate a tooth, cut a

circular groove as deep as possible around the tooth, leaving enough process to hold the peridental membrane intact. In this manner teeth may be moved very rapidly and without much pain. This should always be done by means of screws. By this method we have the tooth or teeth to be moved completely under control. Any of the teeth in the mouth may be used for the fixed point of resistance, thus doing away with all unsightly appliances outside the mouth. When in place, they should be anchored in the usual manner. Antiseptic washes should be used from time to time, such as one per cent corrosive sublimate, listerine, or five per cent carbolic acid.

"In operations of this nature the peridental membrane and also the periosteum are apt to be injured. This was the particular question in recommending it to the profession. Although I have had a few cases of infection, I am quite certain now that such injuries are not of any serious consequence, since with proper precaution no bad results will follow. With this mode of treatment patients are saved time and money, and the operator worry."

Some of the other appliances devised by Talbot are shown in Figs. 15 to 20 inclusive.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

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DERMOID CYSTS LYING WITHIN THE FLOOR OF THE MOUTH—REPORT OF TWO CASES

By M. N. Federspiel, B.Sc., D.D.S., M.D., F.A.C.S., Milwaukee, Wis.
Professor of Oral Surgery in Marquette University

AMONG the number of causes that bring on irregularities of the teeth and dento-facial deformities are mentioned tumors and cysts.

I have had the opportunity to operate on two cases where a dermoid cyst was lying within the floor of the mouth of each patient, the cases being similar also in size and location. Yet one had no effect upon the occlusion of the teeth while the other had a tendency to shift the lower teeth apart.

Dermoid cysts are congenital in origin, caused by the inclusion of the epiderm within the tissues formed from the mesoderm. They are usually formed in the generative organs, but may be found in various parts of the body. The lining consists of stratified epithelium containing dermoid elements such as hair, skin, teeth, nails, sebaceous matter, and more often a thick, creamy, yellowish fat.*

Dermoid tumors, as a rule, are not noticeable at birth or in the young. They do not destroy life, and they may exist throughout life and give little or no inconvenience. Like other cysts, however, they may at any time undergo pathologic changes and become malignant, or in their growth displace adjacent structures so as to impair function.

Dermoid cysts when found in the floor of the mouth occur in one or two situations—in the midline beneath the skin or between the geniohyoglossi muscles, or laterally below the angle of the jaw.†

A very striking example of this is shown in the following case, No. I, which was reported in the *Dental Cosmos,* March, 1917:

*Dudley: Principles and Practice of Gynecology, Philadelphia, Lea & Febiger.
†Blair: Surgery and Diseases of the Mouth and Jaws, St. Louis, C. V. Mosby Co.

CASE I

The patient, Mr. R., was twenty-four years of age and a farmer by occupation. He was referred by Dr. F. A. Tate of Rice Lake, Wisconsin. There

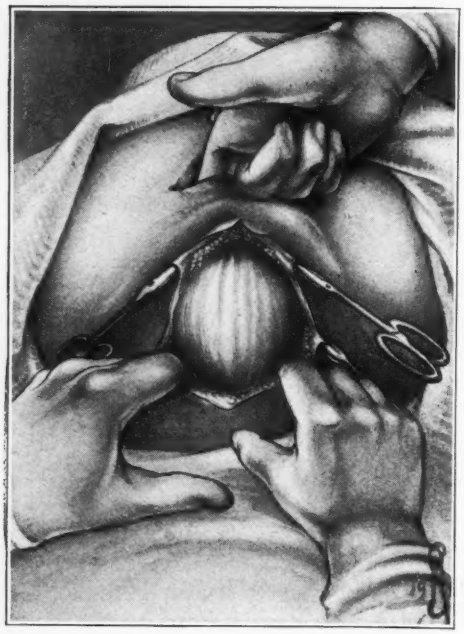

Fig. 1.

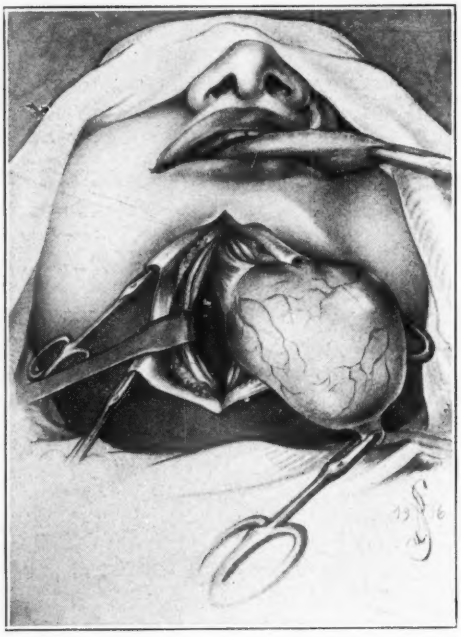

Fig. 2.

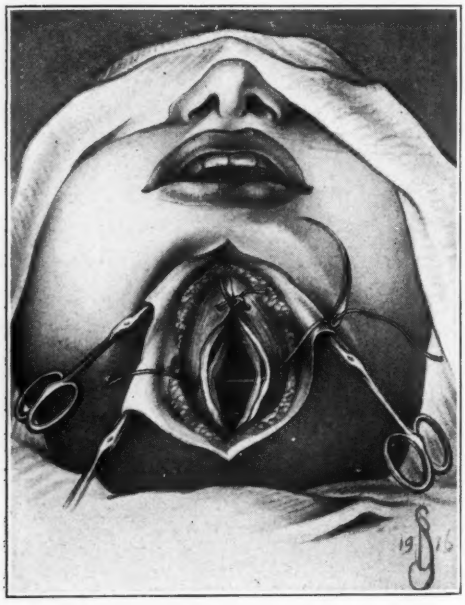

Fig. 3.

Fig. 4.

was a large swelling beneath the tongue. The patient had noticed this swelling in this region about eight years ago. It gave him little or no inconvenience until recently, when he experienced considerable difficulty in swallowing.

Examination.—Within the oral cavity the swelling was so great that the patient's tongue, which was crowded into the pharynx, could not be seen. When the young man was asked to protrude his tongue the swelling would shift downward and project below the floor of the mouth close to the hyoid bone. At no time could the patient bring the tip of the tongue in contact with the anterior teeth. He talked with much difficulty and his breathing was also much interfered with.

Mouth Examination.—Except for a slight gingivitis there was nothing to indicate any abnormality. The mucous membrane lining of the oral cavity appeared normal. The teeth were free from caries and the occlusion was normal. On palpating the floor of the mouth I could detect a doughy feeling within the mass, which itself was moveable.

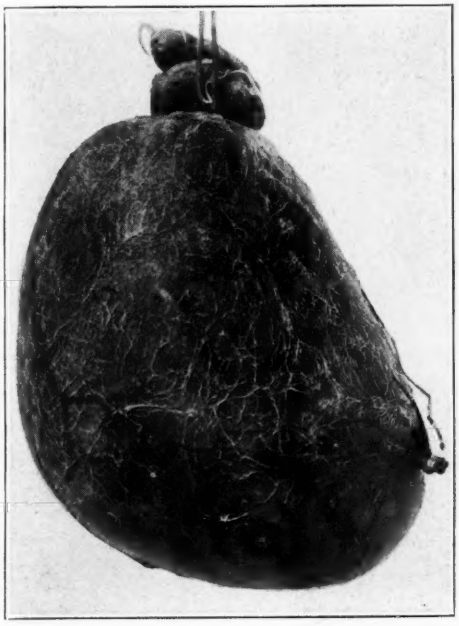

Fig 5.

Physical Condition.—The patient had not been gaining in weight, and during the past several months had noticed that there was a marked loss in weight due to his inability to swallow solid food.

Past History.—There was nothing to indicate syphilis; the Wassermann test proved negative.

The patient was admitted to Trinity Hospital and under ether anesthesia, an incision three inches long was made through the skin, extending from the chin toward the hyoid bone. The muscles were separated by first making a small vertical incision between the geniohyoid muscles and then separating them with retractors. The tongue was then grasped with tenaculum forceps and drawn forward. Pressure was brought to bear on the tongue, forcing the tumorous growth through the opening, as indicated in Fig. 1.

The mass was drawn out gently, while the operator, with the index finger, peeled away the soft tissue surrounding it (Fig. 2).

This blunt dissection revealed the fact that the mass was attached between the geniohyoglossi muscles, from which it was freed by dissection. The muscles were then brought into normal position and were held so with a buried

Fig. 6.

Fig. 7.

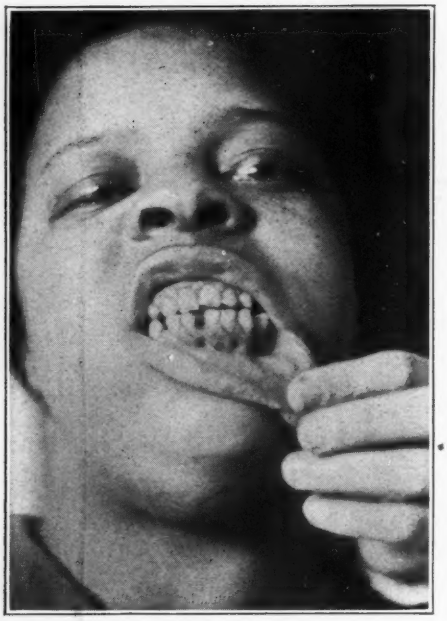

Fig. 8.

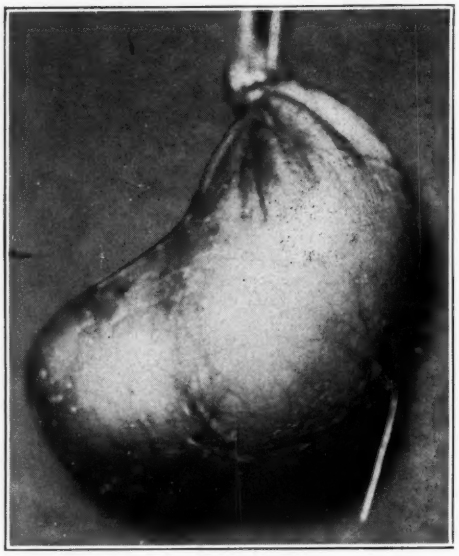

Fig. 9.

catgut suture, and the opening through the skin was closed with subcutaneous suture (Figs. 3 and 4).

The patient recovered rapidly and was discharged one week later.

A laboratory examination of the mass (Fig. 5) proved it to be dermoid

cyst consisting of a fibrous capsule lined with stratified epithelium, and containing a soft cheesy material.

Unfortunately I did not obtain any models of this patient's teeth to show that the normal relation of the teeth was not disturbed by the large mass.

CASE II

The patient, Miss C., was twenty-two years of age, colored, and a nurse by occupation.

History.—When patient was eight years old, she noticed a swelling under her chin. Four months later it broke open and considerable pus was evacuated. The wound healed but the growth gradually enlarged and her lower teeth slowly spread apart. During the last year the patient found it difficult to talk and swallow.

Examination.—The tongue was forced backwards on account of the size of the tumor. The mass would fluctuate upon palpation and by applying pressure beneath the floor of the mouth as illustrated in Fig. 6, the mass was plainly visible, filling the greater part of the oral cavity. When the mouth was closed and at rest, the tumor protruded back of the chin as seen in Fig. 7. Fig. 8 shows marked separation of the lower centrals and the teeth in end to end occlusion.

This case was referred to my clinic at Marquette University. Under ether anesthesia an incision three inches long was made through the skin extending from the chin toward the hyoid bone, the muscles were separated, the tongue was drawn forward and pressure was brought to bear on the tongue, forcing the growth through the opening (Fig. 9). For further description, see Figs. 1, 2, 3, and 4.

Patient made a rapid recovery and was discharged ten days after the operation as cured.

BONE GRAFTING IN GUNSHOT FRACTURES OF THE JAWS*

By William Billington, M.S., F.R.C.S., Captain R.A.M.C. (T.F.), Arthur H. Parrott, M.D.S., L.D.S., and Harold Round, M.D.S., L.D.S.

FOR rather more than two years we have had charge of the "Jaw Department" at the 1st Southern General Hospital, Birmingham (England) to which all cases of injuries to the jaws requiring special treatment are sent from the whole Southern Command. A very large percentage of these cases suffer from compound fracture of the mandible. Successful treatment involves (1) osseous union, (2) functional occlusion, and (3) avoidance of disfigurement.

In the majority of cases these results have been obtained by means of mechanical technic associated with due regard to the establishment of aseptic

*Reprinted from British Medical Journal, No. 3025, December 21, 1918.

conditions. In some, however, satisfactory results can not be obtained by this technic alone. Where there is a gap between the bony fragments greater than half an inch osseous union is rarely obtained unless (1) the fragments are allowed to approximate at the expense of normal alignment, or (2) a bone graft can be successfully introduced.

The gap between the fragments may be due to extensive loss of bone at the time of the injury or to subsequent necrosis from resulting sepsis. Sepsis in these cases is always severe and unless adequately combated in the early stages may be extremely persistent.

It is essential that firm osseous union should be obtained even at the expense of deformity, otherwise the power of mastication is gravely impaired. When, however, the gap is wide, the deformity resulting from allowing the fragments to approximate is so great and renders the fitting of suitable dentures so difficult that it can only be the extreme resort. A satisfactory functional and cosmetic result can then alone be obtained by successfully bridging the gap by means of a bone graft.

Other classes of cases in which surgical assistance is necessary to secure osseous union are those in which (1) there is overriding or malposition of osseous fragments; (2) mobility of the fragments from muscular action can not be prevented by mechanical means—for example, short posterior edentulous fragments.

Operation in these cases consists in carefully dissecting away the scar tissue from between and around the ends of the fragments, rectifying the deformity by the division of contracted muscular attachments and fibrous bands, and immobilizing the fragments by means of a plate and screw. If, as is often the case, a gap remains between the fragments when pared and brought into correct alignment, a small graft is introduced, and the technic is similar to that described for bone grafting.

Bone grafting in fractures of the jaw resulting from war injuries has presented many difficulties, and at first success was so rarely obtained that the attempt was given up and discouraged by very competent surgeons as not being worth while. The alternative of obtaining union by allowing the fragments to approximate led to so much disfigurement and such awkward mouths to fit with satisfactory dentures when the gap was a wide one that we felt compelled to persevere, especially because osseous union could not be obtained in a definite percentage of cases in spite of all sacrifice of normal alignment, etc. To discharge such cases with nonunion was a confession of failure that could only be made with extreme reluctance.

The technic we now employ has been reached only after much experiment, many devices having had to be abandoned. Without enumerating the various stages through which we have passed, we think that a short account of the preparation for and the performance of the operation now in use will be helpful. Whereas, success was the exception two years ago, it is now the rule, and it rarely happens that the graft fails to heal firmly.

PRELIMINARY PREPARATION

This is prolonged, and it may be many months after the original wound was received before the operation of bone grafting can be undertaken. The fracture is always complicated by sepsis, usually severe, and often by extensive injury to surrounding soft tissues. As soon as possible an x-ray examination should be made, after which the patient should be anesthetized and the wound explored. Foreign bodies, teeth in and adjacent to the fracture, and loose fragments of bone should be removed. Larger fragments of bone with reasonably good attachments to soft tissues may be left in the hope that they will live. At the same time it is often possible to carry out some rough plastic work, the fragments of bone being replaced in as normal a position as possible and soft tissues being drawn together. Care must be taken to provide for efficient drainage and access to raw surfaces inside the mouth.

A more or less prolonged interval must now elapse while wounds are healing. Sepsis is apt to be persistent, and one or more subsequent operations may have to be performed for the removal of sequestra and drainage of pockets. During this interval careful attention must be paid to the maintenance of the patient's physical fitness by careful feeding and suitable environment. Much can also be done by means of dental splints, etc., to correct or prevent displacement of the fragments of the jaw by muscular action and contracting scar tissue, even though firm bony union can not be secured.

Finally, before attempting to bone graft, it is very important that dribbling of saliva from the mouth should be prevented by plastic operations. This dribbling is very common when there is a defect in the lower lip, and saliva soaking into the dressings greatly increases the risk of sepsis in the operation wound.

After all wounds inside and outside the mouth have healed an interval of from four to six weeks should elapse before the bone-grafting operation is performed. During this time the patient is usually sent to a convalescent hospital.

Immediately before the operation all dental fixation splints are removed from the mouth. It was found that the retention of these militated against the success of the operation. They caused risk from postanesthetic vomiting, greatly added to the discomfort of the patient, and, where pressure was exerted by them in or near the operation area, increased the risk of sepsis. For these reasons, no attempt is made to fix the fragments of the jaw during the operation or for about two weeks subsequently. Everything which interferes with prompt "healing in" of the graft must be discarded.

OPERATION

A skilled anesthetist is essential, and we owe much to the skill with which Captain McCardie has maintained successful anesthesia under very difficult conditions.

A curved incision is made in the neck beginning one inch behind the extremity of the posterior fragment and ending one inch in front of the end of

the anterior fragment. The incision commences and finishes about half an inch above the line of the lower border of the jaw and in the neck runs about one inch below that line. It is only by carrying the incision well below the jaw and raising a flap that sufficient soft tissue to satisfactorily envelop the graft can be obtained. Often at the site of the fracture there is nothing but dense scar tissue which extends through to the mouth, and great care has to be taken in splitting this to avoid opening into the mouth, an accident which necessitates postponement of the operation. The unsatisfactory bed provided by this scar tissue constitutes one of the difficulties of bone grafting in these cases.

The incision is deepened by cutting upwards and inwards until the lower border of each fragment is reached. The soft tissues covering the outer surface of each fragment are then raised for an inch away from the gap and turned up in the flap. The ends of the fragments and the fibrous tissue occupying the gap between them are now carefully cut away. Finally, each fragment is bevelled by cutting away a flake of bone from its outer surface with bone for-

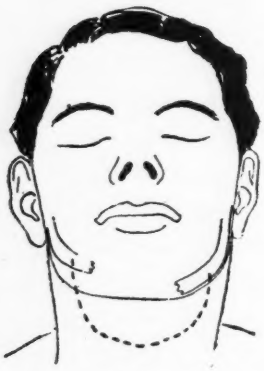

Fig. 1.

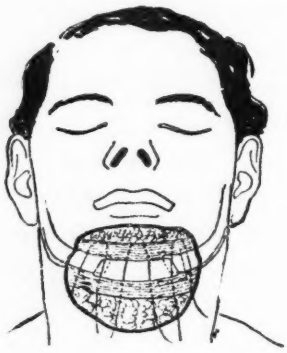

Fig. 2.

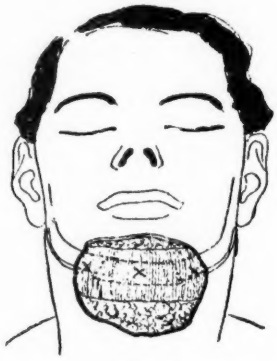

Fig. 3.

ceps. In this way raw bone is exposed at the ends of the gap and on the outer aspect of the fragments for about one inch from its extremity. All bleeding is then carefully arrested and the bone graft prepared.

After experimenting with bone from the ribs, the tibia, and from the jaw itself, the iliac crest was finally selected as the site from which to take the graft. The bone is tough and can be cut with bone forceps without splitting. Further, a graft can easily be obtained of any length or breadth and the natural slightly curved contour of the crest is approximately that of the jaw. The graft should be taken preferably from the same side as the operation wound, thus allowing the patient to lie comfortably on the opposite side.

An incision is made over the crest commencing at the anterior superior spine and extending as far back as required. The muscles are then separated on either side of the crest and pressed back by retractors. The bone is cut by an ordinary Horsley's hand saw. The graft should be two inches longer than the gap to be filled. If a more curved piece of bone is required, as to fill a gap near the chin, the graft is made to include the bone between the superior and inferior spines.

In this way a graft four inches long has been obtained which filled a gap extending from the angle of the mandible on one side to well beyond the chin on the other, and the curve was so accurate that no subsequent modeling was needed.

After removal of the bone the muscles detached from it are sewn together with catgut and the wounds closed. No inconvenience whatever seems to result.

The ends of the graft are now bevelled with bone forceps, the bevelled areas laying on the prepared outer surfaces of the jaw fragments. In this way the graft overlaps the gap at each end for an inch. Two advantages result from this: (1) A broad line of bony contact between the graft and the fragments is provided with increased prospect of speedy firm osseous union, and (2) there is practically no risk of separation in the event of the gap being increased by subsequent manipulations during the application of dental splints, as a certain amount of sliding can take place without contact being lost.

No attempt is made to fix graft or fragments by plates and screws, by wiring, or even by dovetailing the graft into the fragments. All these measures have been tried and discarded. The presence of foreign bodies greatly militates against successful healing, a sinus down to the plate or wire almost invariably forming. Attempts also to make the graft act as a splint by dovetailing it between the fragments have not led to satisfactory results.

Our practice now is to keep the graft in place by sewing the soft tissues closely over the graft and the ends of the fragments by hardened catgut. This has the additional advantage of closely surrounding the graft with living vascular tissue and abolishing dead spaces in which blood clot and serum can collect. This improves the nutrition of the graft and diminishes the risk of sepsis.

Finally, the skin is approximated with a few interrupted stitches. No drainage is employed beyond that of leaving spaces between the skin sutures to allow of the escape of serum. A simple dressing and bandage is applied and the patient sent back to bed.

No attempt is made to reintroduce dental fixation splints until the wound is firmly healed and the compound fracture has been converted into a simple one. This usually occurs in two weeks, after which the case is treated as one of simple fracture of the jaw. Firm osseous union occurs in from two to four months, but it is inadvisable to fit the final dentures until at least four months have elapsed, and it is perhaps wiser to allow an interval of six months.

We intend to supply notes of cases in a subsequent paper. We desire to record our appreciation of the very valuable assistance at the operations that we have received from Captain Learmonth and Sister Dorothy Jones of the 1st Southern General Hospital.

GAS OXYGEN ANESTHESIA FOR MINOR ORAL SURGERY

By John W. Seybold, D.D.S., M.D., Denver, Colo.

GAS oxygen is undoubtedly the anesthetic of choice for the exodontist or dental oral surgeon where a general anesthetic is indicated. It is pleasant to take, quick in action, and generally free from after-effects.

It is a difficult anesthetic to administer, as it is very evanescent, especially for surgery requiring the mouth open as in tonsillectomy, tooth extraction, removal of growths within the mouth, etc. Therefore, in order to successfully administer it one must use every known scientific method available.

There are two methods of anesthetizing a patient. One is to use scientific methods, the other to literally overpower or club the patient down with the anesthetic. In the scientific administration I endeavor to approach the patient from the psychologic point of view. In order to do this it is necessary to start in at the reception room door, so to speak.

The reception room should be an outside room to avoid stuffiness, and it should be light and airy with pleasant furnishings. The girl in the outside office should be of pleasant appearance and tactful. It is her duty to see that the reception room is always neat appearing, and to select the cut flowers and see that they are kept fresh. Patients coming to such a reception room are often very favorably impressed, so much so, that even though the doctor falls short of their expectation as to personality, they will give him the benefit of the doubt. As regards furnishings and wall colorings, they should be in restful colors as it is a scientific fact that coloring has an effect on the nerves; some producing irritation, others restfulness. My idea is to get the patients into the operating room in a favorable state of mind.

The operating room I prefer to be done in gray and white. The walls gray and the wood work and furnishings white. This, of course, should be spotlessly clean, and in charge of a trained nurse. The nurse is required to be tactful as well as an efficient assistant.

The patient is then examined and his medical history taken in order to know what kind of a subject he is.

The next step is the beginning of the final effort to allay any doubt or fear that might still exist in the patient's mind in regard to the anesthetic. It is my practice to take an inhaler and stand in front of the patient and by demonstration and explanations make the taking of an anesthetic appear to be a pleasant experience.

I tell them that the anesthetic will smell like oranges (and it will for I put oil of orange in the nose mask); next that they will feel a pleasant sensation over the face, something similar to that caused by taking a drink of wine on an empty stomach; immediately following that, they will hear music as they go to sleep. This is also a fact, for as they are about to lose consciousness I turn on a phonograph.

Upon examining patients and finding them exceedingly nervous I direct the

secretary to give them an appointment for another day and I prescribe a nerve sedative which is to be taken on an empty stomach one-half hour before operating.

When the woman patient is ready for operation, she is shown to a dressing room and her corset removed. If the patient is a man he is requested to remove coat, vest, collar and necktie.

The patient is seated comfortably in the chair and the headpiece adjusted so that the head and neck is in line with the body. This promotes easy respiration. The nosepiece is held tightly over the nose and the nitrous oxide turned on slowly. After a few respirations the air valve on the nose mask is closed and the oxygen started very slowly. From here on the gas is increased to the dosage for that individual case and at the same time, the oxygen is increased according to the patient's color. Watch the respiration. It should be full and without embarrassment. If it should stop, instantly look for the cause and remedy it. It may be that the tongue has dropped back in the throat, if so get it out. Watch the color of the face and at no time allow cyanosis. Also watch out for a pasty color (putty color); it is very dangerous and the patient's color should be made to come back to a pink before resuming the operation. Do not forget that gas oxygen is a quick acting anesthetic and that a patient can be lost very quickly if the operator loses his head.

When forced to overpower a difficult case with the anesthetic, do so with the utmost caution. Look out for clonic spasms and watch the pupillary reflex. Avoid this method as much as possible. Better stop and resort to nerve-blocking anesthesia.

After obtaining a smooth anesthesia, open the mouth and wall off the operative field with a gauze surgical sponge to prevent blood, mucus and foreign substances entering the trachea.

After completing the operation, do not arouse the patient, but let him return to conciousness naturally and at the same time be on the watch to prevent an aspiration of blood, vomitus, etc.

To recapitulate, make it a point to have your office furnishings and help non-irritating.

Dismiss patients who show evidence of a painful experience by the side door.

Be sure that no blood spots or soiled linen of a previous operation is seen by the patient who is coming in for examination.

Last, but not least, teach your help and yourself that a smile and a friendly greeting go a long way with a nervous patient.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

JAMES DAVID MCCOY, D.D.S., Los Angeles—ROBERT H. IVY, M.D., D.D.S., Milwaukee

B. FRANK GRAY, D.D.S., San Francisco—C. O. SIMPSON, M.D., D.D.S., St. Louis.

It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

AN UNWARRANTED ASSUMPTION OF PROFESSIONAL DUTIES

BY JULIO ENDELMAN, D.D.S., LOS ANGELES, CAL.

Professor of Special Pathology, College of Dentistry, University of Southern California.

THE advent of radiography in the practice of dentistry is responsible to a greater extent than any other measure for that improvement in the technic of dental operations and in the comprehension of pathologic processes in the dental system which has placed dentistry in the foreground of the medical and surgical specialties.

Radiography, on a par with anesthesia and aseptic surgery, has been sowing its benefactions everywhere, and the time is surely at hand when we would relinquish our professional duties rather than to be deprived of the diagnostic value of radiography in the treatment and filling of root canals. As a matter of fact, the pendulum has swung too far now in the direction of radiographic diagnosis to the detriment of those methods of clinical investigation which are being gradually neglected, if not abandoned, and without which we must insist a correct diagnosis can not be formulated in many cases, notwithstanding the availability of any number of radiographs. An optimism concerning the diagnostic efficiency of radiography born of that immutable law that bodies tend to move in the direction of least resistance is responsible to a large extent for the present unsatisfactory status of dental diagnosis. Dentists as a class are gradually losing all sense of clinical diagnosis, leaning almost exclusively upon radiography with results that are not by any means invariably satisfactory. If radiograms could be depended upon, in all instances, to portray accurately the nature of pathologic processes occurring within calcified tissues, no valid

objection could be raised against its employment even to the abandonment of other methods of diagnosis. Radiography has a place in dental diagnosis, superseded in importance by perhaps no other method, but radiography alone can not be depended upon for a correct diagnosis in all cases, any more than clinical diagnosis can be relied upon to the exclusion of radiography. The happy combination of radiography with clinical diagnosis leads to an accuracy of results which can not be attained by either of these methods separately and should be practiced jointly whenever possible. To rely upon a radiogram for a diagnosis without the assistance of the history of the case, all subjective and objective symptoms, percussion and palpation, and other recognized procedures in diagnosis, is to place the patient's physical welfare at the mercy of the inaccuracies of the x-ray machine. Not infrequently dental diagnosticians find it necessary to secure as many as six radiograms of a single area before becoming satisfied that a fairly accurate portrayal of intraosseous conditions has been secured, and even then a diagnosis is withheld until a clinical examination is carried out. But as against this, we have the commercial radiographer who, on the basis of perhaps only one picture, and with no training whatsoever in the fundamental and special subjects of dentistry, ventures out with diagnosis of questionable accuracy and dangerous possibilities. Securing a radiogram and interpreting it are two entirely different things, each requiring a different kind of knowledge, and *ipso facto* the ability to secure a radiogram does not presuppose the knowledge that is necessary in order to make a radiographic interpretation based on the anatomy of the area involved and the nature of the pathologic processes at work. We have had radiographs submitted to us with a written diagnosis (?) appended to them, prepared by men who possess no warrant, legal or moral, for venturing into fields unknown to them. And this adverse criticism is directed not alone at the radiographer who is not a dentist or a physician, but with equal force at those physicians who, unfamiliar with pathologic processes in the dental system, diagnose abscesses where none are to be found, overlook peridental infections where it is obvious they are raging, giving patients a clean bill of health as far as the mouth is concerned, even though an extensive chronic gingivitis may be present, or order the wholesale extraction of teeth for reasons unsupported by facts. The average physician has not the necessary dental educational qualifications to justify any assumption by him of the role of dental diagnostician. As between the radiographer without medical or dental training and the physician radiographer with a smattering of dental knowledge, we would not hesitate in choosing the former. He is the less dangerous of the two.

The time has come to call a halt to a practice,—to an assumption of professional duties as dangerous as it is reprehensible, by those who evidently do not know that for the purpose of acquiring the ability to diagnose and correct pathologic processes or abnormalities in the mouth dental colleges offer courses of instructions covering a period of not less than four years to those possessed of the necessary preliminary educational requirements and moral qualifications. Dentists with a sufficient amount of training in dental pathology and allied subjects are the only ones justified in formulating diagnoses of dental conditions.

AN UNUSUAL ANOMALY—WHAT WOULD YOU DO WITH IT?

By James David McCoy, D.D.S., Los Angeles, Cal.

Professor of Orthodontia and Radiography, College of Dentistry, University of Southern California

NOT frequently the x-ray reveals conditions so unusual that the average operator is at a loss to know what course should be followed in the way of treatment.

The condition revealed in Figs. 1 and 2 can justly be placed in this class. The history of the case is as follows:

The patient, a woman thirty-three years of age, was referred to me about four years ago by a rhinologist, who requested radiograms of the teeth and their adjacent structures.

At this time the patient had a catarrhal discharge from both sides of the nose which stubbornly refused to yield to treatment; and as there were no conditions within the nose to account for the discharge, the rhinologist suspected sinus trouble of some character. The sinuses were examined and were found to be negative. However, upon transillumination the left maxillary sinus appeared somewhat different from the right, so the rhinologist suggested radiograms as he felt that the teeth on that side might be giving some trouble. His decision no doubt was influenced by the fact the patient was wearing a bridge which extended from the lateral incisor to the first molar. The writer made extraoral radiograms of each side with the result that on the left side the condition shown in Fig. 1 was discovered.

At this time no painful reflexes were apparent and a close study of the radiogram apparently revealed the fact that the embedded tooth was not the source of any pathologic process. This being the case the rhinologist thought it best to let the tooth remain so long as it was not producing conditions detrimental to the patient's welfare.

About two years after this first radiogram was made the patient made the complaint that the left ear had begun to be "slightly noisy" or that there was a "ringing sound" in it. Since then this noise has increased and the hearing has become impaired.

Two years later I again came in contact with the patient and found that her hearing has been practically lost on the left side. Several months ago the patient had an attack of iritis, but only the left eye was affected. This attack lasted about two weeks, during which time she was under the care of an oculist. She tells me that drafts of cold air against her face cause pain within the nose, but that there is no discomfort to the outside of the face. Several days ago I made the radiogram shown in Fig. 2. I tried to make this from the same angle from which I had made the previous one and feel that I succeeded pretty well.

While the condition above the inverted cuspid does not show any radical

change, it seems to me that upon the close study of the original plates I can discern an area of lessened density above the cuspid which would indicate to me the formation of a cyst about the tooth.

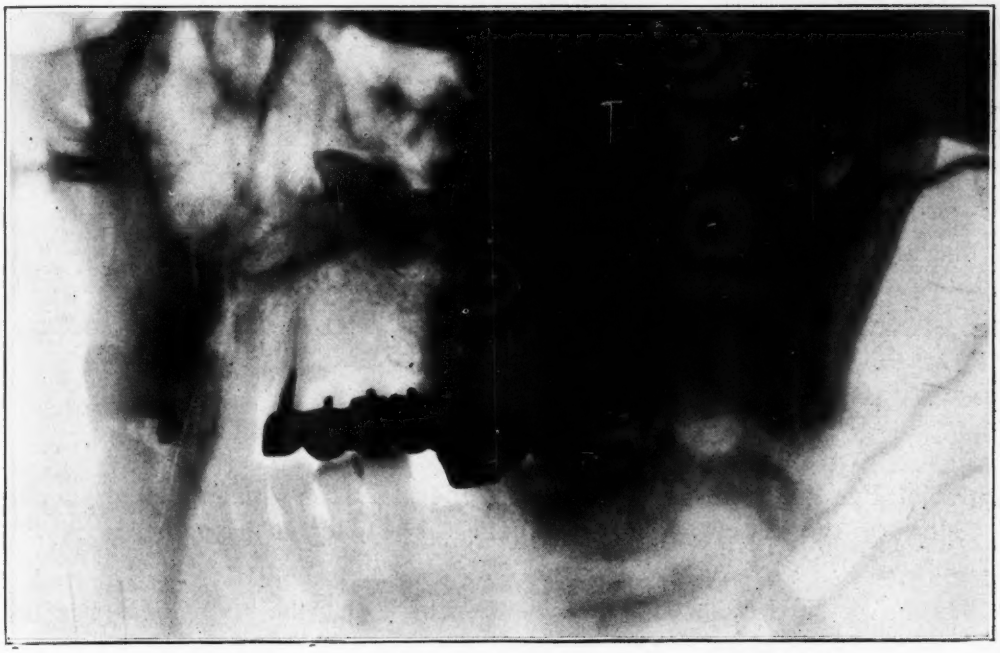

Fig. 1.—Showing inverted cuspid tooth lying against the anterior wall of the antrum.

Fig. 2.—Radiogram made four years after the one shown in Fig. 1.

I am reasonably sure in my own mind that this tooth should be removed, but in order to remove it an operation of a radical nature would have to be performed.

If it were your case, what would you do with it?

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

ORTHODONTIA

Artificial Feeding and Its Bearing on General Disturbances and Malocclusion of the Teeth. M. Hellman. The Dental Cosmos, 1919, lxi, No. 2, p. 97.

Upon the basis of extensive etiologic studies along the line indicated in the title, the author arrives at the following conclusions: 1. Malocclusion of the teeth is neither a normal manifestation nor a normal variation, but rather a deviation from the normal to such an extent as to belong to the domain of pathology. 2. Pathologic conditions can be recognized by their diagnostic manifestations alone, and these will be of significance only as they may link the symptoms with their causes. 3. Malocclusion of the teeth has been found to occur most frequently in those individuals who were artificially fed (bottle-fed) in infancy. Of 268 patients presenting occlusal anomalies, 217 (equal to 81 per cent) were bottle-fed, or breast and bottle-fed. 4. Malocclusion of the teeth has also been found to stand in close relationship with many general disturbances caused by artificial feeding. 5. The health of the artificially fed is subject—apart from various disease processes—to political, social, and economic circumstances. 6. Of 215 cases of malocclusion examined, the fact was revealed that besides various other manifestations, symptoms were observed which are very much akin to those prevalent in rachitis, spasmophilia, and the exudative diathesis. It is therefore probable that the symptomatic factors of these disturbances found in conjunction with occlusal anomalies are but surviving manifestations of a common cause. 7. The prognosis concerning pathologic conditions, including malocclusion of the teeth, must be made from deductions based upon the evidence borne by the causative factors and diagnostic manifestations. 8. The suggestion may, therefore, be advanced that in order to promote the progress of our specialty, more definite knowledge pertaining to the etiology of malocclusion is an urgent necessity. This knowledge may be gathered from the diagnosis of our cases, provided it includes not only a record of the form of the dental arch and the position of the teeth and jaws, but also the various general dis-

turbances which the individual has passed through before presenting for treatment—for general disturbances may in many instances not only be the means of yielding a clue to the solution of many a baffling problem, but may also serve as powerful indications pointing to the origin of prevailing conditions.

Use of Orthodontic Appliances in the Treatment of Fractures of the Mandible and Maxilla from War Casualties. Arthur Zentler. The Dental Cosmos, 1919, lxi, No. 2, p. 128.

The great benefit that restorative oral and facial surgery for defects caused by modern trench warfare has derived from the teachings of orthodontia has placed this branch of orthopedics in the position of being as proud of its achievements as any one of the other means or methods employed for reclaiming the war-maimed for society. One need only compare the ultimate appearance of those who were not fortunate enough to obtain treatment with the aid of orthodontic appliances for war wounds resulting in jaw defects, with that of those who have had the benefit of such treatment, to realize the great need in military hospitals for men acquainted with the principles of orthodontia and the practical application of it, in collaboration with the oral and plastic surgeon.

For the purpose of demonstration the author shows 21 slides, illustrating two cases treated with the more rudimentary method of bandaging, etc., in comparison with a few treated with orthodontic appliances. In conclusion, the author states that the principles governing the treatment of all the cases, as regards the orthodontist, are those applied in the movement of teeth, stimulation of cell growth, and retention. He states they are problems with which the orthodontist is thoroughly familiar.

It remains only to call attention to the fact that while modern orthodontia practice is diminishing the diameter of the arches used for treatment, the diameter of the wire used for arches in fracture cases is of necessity much heavier. It is never less than 2 mm. and often 2½ mm. in diameter. It is important in usual orthodontic treatment for anchor bands to be extremely well fitted and properly cemented, it is doubly important that these two factors should be especially well observed in fracture treatment with orthodontic appliances, the parts brought into correct relation having a great and constant tendency to relapse until complete consolidation of the bone has taken place. The fact that not only methods and appliances at present in vogue in orthodontia, but even such as have been discarded by the modern orthodontist, can successfully be adapted and used in treatment of fractures is surely more than gratifying.

ORAL SURGERY

Maxillo-dento-facial Malformations. P. Robin. Paris Medical, 1918, viii, No. 25, p. 492.

Irregularities of the teeth and of the jaws, altering esthetic configuration of the face as well as the shape and size of its cavities, are discussed by the author in relation to disease of the digestive and pulmonary apparatus in children. In many cases, some malformations of the jaw or teeth are found to be responsible for inadequate mastication or insufficient breathing. The correction of such maxillary or dental irregularities constitutes the first rational step in the causative treatment of gastrointestinal affections and pulmonary disturbances. The author's functional method of readjustment was successfully employed by him in his hospital, as well as private practice, favorable results being obtained without the slightest fatigue or pain on the part of the patients. The method is applicable as soon as the eruption of the milk teeth is completed, namely, about the age of three years. It does not act upon teeth, but, on the contrary, on the bones of the maxillæ themselves, which are slowly dilated by means of a small invisible apparatus worn in the interior of the mouth. This apparatus is left in place all night, and as much as possible in the day time; it is always removed for eating. The maxillary bones assume their normal form during the treatment; the teeth find their own places and become perfectly regular without having to be touched. This procedure is claimed to accomplish the correction of facial and dental deformities, excessively receding or protruding chins, etc. As a result of better breathing, the child's general development is improved, and even the intelligence is benefited, for the apparatus works not only on the bones of the jaws, but also favors the development of the cranial bones.

Bone-grafting in Ununited Fractures of the Mandible; with Special Reference to the Pedicled Graft. P. P. Cole and Ch. H. Bubb. British Medical Journal, January 18, 1919, p. 67.

The authors employed the method of pedicled grafts in thirty-four cases; the method of free transplants is only adopted by them when a pedicled graft can not be utilized and was employed in twelve cases only. The conditions their experience has shown to be necessary to permit the performance of a pedicled graft operation are summarized as follows:

1. Site of fracture. The loss of tissue must implicate the horizontal portion of the bone; that is, the lesion must be situated at, or in front of, the angle.

2. Size of the gap. This should usually not exceed 4 cm. In favorable circumstances it is possible to cut a thick, well-nourished graft of 6 cm. in length, and a gap of 5 cm. (before trimming) may thus be dealt with, if end-to-end union is resorted to.

3. Condition of the soft parts. It is necessary that the tissues of the submaxillary triangle should be free from scar tissue on the side from which the graft is to be cut. It is extraordinary how frequently this area escapes even when the soft tissues of the face are extensively damaged.

The result is known in twenty-three of the thirty-four cases dealt with by this method; twenty-one of these, or over 90 per cent, have been completely successful. In the two remaining cases, the condition was very considerably improved and the patients themselves were thoroughly satisfied. The pedicled graft operation permits the utilization of a portion of living bone, possessed of its own blood supply, passing to it from a natural musculofascial pedicle. A lesion on one side can be dealt with by a graft taken from the opposite side; the ability to do this has been demonstrated on several occasions.

In the authors' twelve cases of free transplants—restricted to conditions not permitting the use of a pedicle graft—the result is known in ten, and of these, seven have been completely successful, giving a percentage success of seventy. Splints are removed in from three to six months. Progress is slow. and firm consolidation can not be expected in less than six months to a year.

In no case of nonunion dealt with by the authors, no matter what the nature of the operation (plating, wiring, pedicled graft or free transplant) has the patient's condition, general or local, been adversely affected by operation. "Finally, there has been no mortality and no complication of a nature to cause alarm."

Fractures of the Ascending Ramus of the Inferior Maxilla. L. Imbert and P. Real. La Presse Medicale, November 25, 1918, p. 601.

Fractures of the ascending ramus of the lower jaw were very imperfectly known prior to the war. In these cases, it is always difficult or even impossible to demonstrate the ordinary pathognomonic signs of fracture, in the form of bony crepitation and abnormal mobility. However, although the symptoms may at first sight appear obscure, these patients present as a rule very characteristic, in fact pathognomonic, changes in the articulation of the teeth. Only those fractures are here considered which are associated with a displacement of the fragments, due to muscular action and always occurring in a given direction. The principal fragment, consisting of the larger portion of the mandibular arch becomes considerably displaced, being drawn upwards and slightly backwards through the action of the internal pterygoid and masseter muscles. The small fragment, comprising the coronoid process, the condyle, and a more or less considerable portion of the ascending ramus, moves upwards and forwards under the action of the temporal muscle. In a case of fracture without loss of substance, the fragments override each other; in the presence of a more or less marked bony gap, on the contrary, a depression is produced at the level of the fracture focus. The result of these displacements is always a shortening of the ascending ramus of the jaw. This modification in the length of the fractured bony lever governs the disturbance of the interdental relations in the closing of the jaws, and separation of the jaws in opening the mouth, and in performing the different movements of the mandible. The prognosis of fractures of the ascending branch with displacement is on the whole rather favorable, provided they are properly treated. Consolidation is the rule, even in the presence of fairly extensive destructive lesions. The treatment of these fractures consists of reduc-

tion followed by immobilization of the fragments. Whereas the reduction of the principal fragment is easy enough, the small fragment, on the contrary, is often more or less inaccessible, especially when the fracture is situated high up, and considerable difficulties may be encountered in attempts at reduction and immobilization. The reduction of the small fragment is fortunately not indispensable, experience having shown that it does not undergo any notable deviation when immobilization of the jaws in occlusion is accomplished at an early date.

Resilient Teeth: A New Development in the Making of Artificial Dentures. Morse Withcombe, Australia. British Dental Journal, 1919, xl, No. 2, p. 48.

This device consists of a solid porcelain tooth which is so fitted and retained in a metal socket that it has a limited range of movement in every direction. At the base of the porcelain tooth is baked a layer of metal filings to which the soft rubber, when vulcanized into the socket under pressure, adheres most tenaciously, thereby preventing any possible ingress of secretions between the porcelain tooth and the rubber in the socket. Furthermore, the springy movement of the rubber during mastication makes it impossible for secretions to remain about the margin of the collar. It is claimed that this artificial periodontal membrane permits of some amount of individual tooth movement and that it acts as a shock absorber and prevents the teeth clacking together. A Sydney bacteriologist examined some of these teeth which had been worn in the mouth. He reported that he received direct from the mouth a plate containing three teeth. The plate was washed in sterile normal saline, and the teeth were very carefully broken out of their beds, which were composed of good red rubber. There was not the slightest odor to be detected. Agar slopes were inoculated from the material left in the cavity from which the teeth had been broken and from the surface of the rubber bed. After forty-eight hours all cultures remained sterile.

Anesthesia for Dental Operations. R. W. Hornabrook, The Medical Journal of Australia, 1918, ii, No. 3, p. 63.

The following is a return of the general anesthetics administered at the Melbourne Dental Hospital from July 1, 1906, to June 30, 1918, viz., a period of twelve years. All the administrations have been given in the upright position, the patient sitting in the dental chair. There has not been one fatality, and it is extremely rare to have any sign of collapse. Of the total number of 32,236 administrations, 30,433 were cases in which ethyl chloride or somnoform was used alone, or in conjunction with other anesthetics. The present method is to use 2 c.c. of ethyl chloride in conjunction with 5 c.c. of somnoform in the majority of cases. The anesthesia is what may be called a "push anesthesia," in that the air valve, which is circular, and not less than 1.25 cm. in diameter, is gradually closed over and not completely closed until the patient is just about fully under, viz., from three-quarters to one minute from the commencement

of the administration. Nitrous oxide has been practically abandoned as an anesthetic in this hospital since the end of 1915; in fact, in only 145 cases has nitrous oxide been used since June 30, 1912, the semi-open ethyl chloride or somnoform administration having been found to be more convenient in every way and equally safe.

Complete record of twelve years' anesthetics:

Nitrous oxide,	1,654
Nitrous oxide and ethyl chloride,	3,778
Ethyl chloride,	11,969
Somnoform,	13,859
Ethyl chloride, chloroform and ether,	51
Ethyl chloride and ether,	91
Ethyl chloride and somnoform,	485
Ethyl chloride and oxygen,	197
Nitrous oxide and oxygen,	138
Chloroform,	11
Nitrous oxide and somnoform,	3

In the 13,859 somnoform cases, a number of those in which 2 c.c. of ethyl chloride was given with the 5 c.c. somnoform is included.

Salivary Tumor of the Parotid Gland. H. Kuttner. Deutsche medizinische Wochenschrift, 1918, No. 11. Correspondenzblatt fur Schweizer Aerzte, 1918, No. 45, p. 1512.

The author discusses a rare condition of painless intermittent salivary tumors of the parotid gland, in the absence of a demonstrable obstacle. The symptom of intermittent salivary tumor is usually considered as typical of salivary calculus. Very painful acute swellings of a salivary gland make their appearance in the form of salivary colics, usually during meals. The phenomena gradually subside again, after a profuse evacuation of saliva, sometimes also of pus. More early, similar phenomena are observed in inflammation of the main excretory ducts, especially the parotid duct; there may be paroxysmal swellings and pains, caused by obstruction of the duct with a fibrinous plug. In certain cases, the inflammation takes a chronic course and the duct remains permanently thickened.

In two cases of well-marked salivary tumor, under the author's observation, no obstacle could be demonstrated and all inflammatory symptoms were absent. The retention of saliva induced a considerable swelling of the parotid gland, occurring during meals and associated with a sensation of slight tension. After a few days, the phenomena subsided, without any therapeutic measures in one of the cases. In the other case, the salivary duct was cautiously catheterized, without encountering an obstacle, the catheterization was followed rather by an increase in the disturbances. Both these patients were women with a delicate skin, and the trouble appeared in the cold season of the year. The author is inclined to refer the anatomic bases of this salivary retention to a plug formed by the secretions, or to a swelling of the buccal mucosa.

Salivary calculi are not likely to cause diagnostic difficulties unless the stone

is situated within the gland—almost invariably the submaxillary gland—or in the first part of the excretory duct. The difficulties increase when well-marked inflammatory phenomena make their appearance in the surroundings of the gland. Catheterization and radiography are reliable adjuvants in these cases.

An Experimental Study of the Influence of Diet on Teeth Formation. M. Mellanby. (From the Household and Social Science Department of the London University, Kensington.) The Lancet, London, December 7, 1918, p. 767.

In this preliminary report to the Medical Research Committee the author describes her experimental finding in puppies, concerning the factors involved in the development of sound teeth and of the growth of the jaws in relation to the size of the teeth. Evidence is adduced to show that : (1) hypoplasia of the teeth is caused largely by a deficient diet; (2) the factor in the diet which controls the calcification of the teeth is something of the nature of an accessory food factor(vitamine); and (3) is largely responsible for the calcification of bone, a deficiency of this substance in the diet being followed by the development of rickets. The teeth may become so soft that they can be cut with a scalpel.

The diets of the dogs, on which they were put when approximately eight weeks old, consisted chiefly of white bread and separated milk, about 200 c.c. daily, together with the fat substances to be tested; namely, codliver oil, butter, and linseed oil, which were added in daily quantities of 10 gm. respectively, in three groups of animals. The experiments showed that when linseed oil is the only fat in the diet, there is a delay in the shedding of the deciduous teeth and in the development of the permanent dentition. The animal fats, more particularly codliver oil, cause these changes to proceed in a normal way. The arrangement of the teeth and their appearance is much better when animal fats have been eaten. In the experiments so far completed, the teeth most commonly affected are the lower carnassials. There is some evidence to show that if the diet is only started when the puppy is over three months old, then the development of the teeth is little if at all affected.

In summarizing the results, the author emphasizes that this is an instance of diet affecting the teeth from the inside and is independent of bacterial sepsis and other oral conditions associated with food. "There is no doubt that our modern dietary is harmful so far as the teeth are concerned." Specially prepared cereals, which constitute a considerable part of the modern diet, especially in the poorer classes, in the form of wheat, rice, oats, etc., as well as bread and potatoes, are deficient in the type of accessory food factor found in whole milk and the animal fats, which favors the development of sound teeth.

Adenoids, Decayed Teeth and Irregular Arches. C. N. Peacock. British Dental Journal, 1918, xxxix, No. 23, p. 689.

A flat plate of vulcanite or metal, made by the author, is recommended for the prevention of mouth-breathing in sleep. This type of plate has been used in the treatment of pyorrhea for some time past. The plate slips in between the

lips and the teeth, extending as far back as the first molars, and is as wide as the child can conveniently bear so as to prevent mouth-breathing. It should be worn regularly for the first four months, three times a week for the second four months, down to one night a week, according to age and condition of teeth.

RADIOGRAPHY, Etc.

Radiotherapeutic Dosimetry. H. Guilleminot. Archives d'Electricite Medicale et de Physiotheraque, 1918, xxvi, p. 395.

The necessity of accurate knowledge of dosage in radiology is emphasized by the author, who contributes two methods devised by him for the measurement of x-ray doses. The first is a fluorometer, in which the fluorescence of a barium platino-cyanide screen produced by the incident x-rays is standardized against a quantity of radium affixed to the apparatus in the vicinity of the screen. This method is very accurate, but also very expensive on account of the high cost of the radium standard itself. The second method is a fluorometer with a luminous standard, the light from a standard electric bulb being cut down by appropriate colored screens until it affords a degree of luminosity and a tint which are comparable with the luminosity of a fluorescent screen contained in an adjacent part of the apparatus when acted upon by the x-rays which it is desired to standardize.

The effective dose of x-rays at various depths in the tissues depends largely on the varying degrees of hardness of the rays. The behavior of the body tissues towards the x-rays was determined in the author's experiments by means of hydrated gelatine of density 1.05, which is approximately equivalent to the specific gravity of the tissues. The effect depends on the amount of radiating energy fixed by the cell plasma. From the therapeutic viewpoint, it appears advantageous according to the author to utilize in case of superficial lesions of the integument, a radiation No. 7 with filtration of about 1 millimeter. In case of deep lesions, more filtration is required, increasing in proportion to the depth of the lesions. Several entrance avenues for the rays should be employed in order to augment the efficiency of the dosage.

Radium Treatment for Epithelioma of the Lower Lip. G Elliott. International Journal of Surgery, 1918, xxxi, 394.

Elliott recommends radium therapy for epithelioma of the lower lip. He claims the cosmetic result is very satisfactory. Very often there is no scarring. It is a pleasant treatment to the patient, some even claiming that they never feel any pain at all during the healing process. Yet others quite often complain of considerable pain.

Elliott claims that radium does not act in the same manner in all individuals. In some reaction has set in within eight days and with the same applicator as late as fourteen days.

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EDITORIALS

Students' Army Training Corps—A Success or a Failure?

ON or about December 21, practically all of the students who were members of the S. A. T. C. were demobilized; thus passed into history one of the greatest and most unique undertakings which was the outgrowth of the war. Whether the men in the S. A. T. C., especially medical and dental students, should have been educated to perform their particular service or whether they should have been given a certain amount of military training is still a question. We find some educators in literary schools raising the question as to whether the S. A. T. C. was a success even among such schools and departments.

When the draft age was extended to include practically all college students, it became necessary to do something to protect the schools and the universities, or they would have found themselves without students. Army men also recog-

nized the necessity and value of college trained students, not only as soldiers, but also as candidates for officers' training camps, and consequently the S. A. T. C. was the result of efforts made to protect the universities and colleges and to provide them with students, and still make the students subject to draft and military training. We realize that the plan was not carried out long enough to establish a proper cooperation between the military and educational authorities.

In the first place, it became necessary for the college curriculum to be arranged so as to provide certain hours for military training, and if those particular hours had been adhered to closely, some of the conflicts which arose, would not have occurred. By that we mean, for example, say two hours of military training was required each day, the college curriculum was arranged to provide for those four hours and then it was presumably supposed by the educators that the remainder of the time would be allotted to collegiate work and be free from military training. While technically probably four hours (or whatever the average time was) for military training might be all the students were given credit for, however, if anything extra developed along military lines, the extra time was taken out of the collegiate work and collegiate time and not out of military time. For example, if it became necessary for a student to have a medical examination, or have insurance papers filled out, and any other clerical tasks performed, receive his pay or anything else, which had a strict bearing upon military life, that time was not taken out of the time allotted to military training, but was taken out of the collegiate work. Consequently as a result of this, classroom work and laboratory work was extremely irregular and along with military, kitchen, and fire police duties, students were always provided with satisfactory excuses when late to a class, and it was an excuse over which the collegiate instructor had no power. So far as we know there were no open breaks between military and civilian collegiate authorities, because the collegiate authorities realized the military power was supreme, and consequently adapted themselves to the condition, even if those conditions were the result of an overenthusiastic second lieutenant who had just returned from an army training camp.

As it developed, if at any time during the day the commander of the S. A. T. C. camp decided that he wanted a particular lot of men, regardless of what class they were in, lecture or laboratory, the whistle was blown and the whole lot called out of class to receive the military instructions. We admit that in some cases it may have been a military necessity, but in most cases it was done without the military authorities realizing the responsibility or the impracticability of calling the students from the midst of the class to perform some task or to receive some instruction which they could or should have received during the hours set aside for military training.

Owing to the fact that students were under military discipline it was very difficult to keep attention in the classroom because a great many students took the attitude that the military authority was the only one that could control them, and so far as the collegiate authority was concerned, the students could do practically as they pleased, for the universities and schools were at the mercy of the military authorities. Possibly such things as we have mentioned would have been adjusted had the S. A. T. C. existed a longer time, but up to the present time it was very destructive to regular classwork and made it practically im-

possible to follow a certain schedule or perform a certain amount of teaching in an allotted time. Some educators had become so discouraged that they were talking of resigning, and, had the S. A. T. C. continued longer, there would have been many vacancies on teaching staffs.

We believe it would have been better to have taken certain students and given them strict military training under military men, and other groups, medical and dental, should have been given strictly professional work for the amount of military training the medical and dental students received only interfered with their professional training to such an extent as to make them deficient compared to other years, and still did not give them any great amount of military efficiency.

In August and September when it became known that every student who entered college would become a member of the S. A. T. C., be allowed to take certain lines of college work, be given his uniform, mess, and thirty dollars a month, a large number of students entered college simply because of the seemingly great advantages held out to them. Consequently, a large number of students began college work who had no intention of ever finishing when they began, and simply took that method as a means of avoiding an immediate service in the army; and as things have developed, succeeded into getting out of actual service by entering the S. A. T. C. This class of students demoralized college work more or less, and, consequently, they have been one of the most disturbing factors in keeping class discipline encountered. Consequently with the disbanding of the S. A. T. C. we find a large number of students who will discontinue college work, and go back into commercial life without having benefited themselves to any great extent, and without benefiting the school or university.

One of the things which developed from the S. A. T. C. was the compulsory hours of study which at first glance seemed to be an advantage, but which from a practical standpoint failed to accomplish any great results. It is true that the students were required to assemble in certain halls for definite hours of supervised study, but the actual result accomplished during those supervised hours from information obtained from observation and conversation with the student, and from the knowledge of the men who supervised the studies, very little was really accomplished. First, it was rather impractical to have a large number of students studying together in one room, because it is almost impossible to avoid some sort of disturbance. Second, owing to the crowded curriculum which was necessarily found in the schools, as a result of military training, the supervised hours of study came after everything else was done, and most of the students were in no physical or mental condition to apply themselves during these supervised hours.

Taking the thing as a whole, during the length of time the S. A. T. C. was in existence, we believe it would have been better to have had military training and professional instruction separate. We believe better results could have been obtained in both cases.

The Prostitution of Radiography

A FEW years ago when radiography was given to the medical and dental professions as an aid in the diagnosis of obscure conditions, a great many of the more progressive men hailed it as one of the greatest adjuncts that had been given the professions. A number of men in both professions immediately took up radiography to aid them in their work, and also began making pictures for others of the profession.

As the success of radiography depends a great deal upon the equipment employed, commercial concerns very wisely began improving their output of machines and tubes. This improvement from the manufacturer's standpoint opened a field for young men as commercial salesmen, who consequently learned the radiographic technic from a purely business standpoint in order to enable them to make satisfactory pictures for demonstration purposes when attempting to sell a machine or when demonstrating before medical and dental conventions.

With this knowledge of radiographic technic, and with practically no knowledge of anatomy and physiology, only such as they were able to absorb from conversation with medical men, some of these men established "X-Ray Laboratories" in various cities for the purpose of making pictures for the profession as well as the public. From the purely commercial standpoint these progressive individuals should not be criticized, because they realized they could make more money than by confining themselves to selling x-ray apparatus. However, the difficulty arose from the fact that there was gradually creeping into the practice of radiography a number of men who had no idea of professional ethics and who were absolutely ignorant in regard to asepsis, anatomy, and physiology. Many of these laboratories began making pictures on a strictly commercial basis, for so much a picture, rather than making them in relation to the value of the picture in the treatment of the conditions presented. In other words, it makes no difference to the laboratory how obscure the condition may be, or how evident or simple the difficulty, each picture is made absolutely alike, for the same price, and is given the same technic. Under ordinary conditions satisfactory pictures often are made; however, in the majority of cases when obscure conditions arise, where the picture can be only satisfactorily made or interpreted with a knowledge of the clinical conditions of the case, by some one who has an intimate understanding of pathology and anatomy, the pictures are practically useless.

In some instances pictures are made in x-ray laboratories upon the solicitation of the public, while other laboratories realize the advantage of advertising that they make pictures only for the profession. Regardless of the plan followed, it still leaves the objection that the patient is referred to an x-ray laboratory that is conducted by an individual who has no idea of professional ethics, no idea of hygiene or antisepsis, consequently a patient is very likely to become infected from the fingers of the operator, because he (the operator) realizes the more rapidly he can take his picture, the more money he can make, therefore antisepsis is discarded. Such a thing as washing the hands when passing from

one patient to another or sterilizing the equipment that comes in contact with different patients is unheard of in the majority of the x-ray laboratories. Just exactly how many pathologic conditions have been spread through commercial x-ray laboratories it will be impossible to state because there is no means of checking this up.

We find a large number of the profession who have unwisely supported these commercial laboratories because of the small charge they make, the laboratories being able to make this small charge because they are run on a basis of volume instead of diagnostic and scientific value. Very often we receive in our office announcements of x-ray laboratories having long, high-sounding names, but failing to give the name of the proprietor or men who are responsible for the work. In other words, the members of the profession are invited to send their patients to a laboratory without knowing the standing or ability of the man who is to make the radiogram.

Most of these men conducting x-ray laboratories have only the knowledge gained by some experience with electricity and photography, and their knowledge of anatomy and pathology is nil, or at least so meager that they can not be recognized as dental or medical men. Some of them have been x-ray salesmen, while others have been window trimmers and have graduated from that trade into that of making a diagnosis for professional bodies within the space of twenty-four hours. In one announcement which we have on our desk we read the statement "at the end of each month we will mail you a check of twenty-five per cent of all the business you send us." We do not know who the owner is, for no one is mentioned as the proprietor of the laboratory, consequently, such a thing as personal responsibility is not considered because no reliable ownership is mentioned.

Many states have laws which make it necessary for those practicing dentistry or conducting "dental parlors" or advertising offices to use their own names, but regardless of this, x-ray laboratories are allowed to exist and solicit business from the profession and not use any individual name. Much has been written on the ethics of paying commissions, still x-ray laboratories openly advertise such facts. Even though we disapprove of the paying of the commission, we must confess respect for the laboratory that is bold enough to advertise its plan, and not do as some dental and medical men do, namely, condemn the practice openly and be a party to it privately.

The dental profession has been forced to submit to dental laboratories for a number of years practically for the same reason that they are contending with commercial x-ray laboratories. It is true that a number of men working in the dental laboratories are making a certain style crown quicker, better, and cheaper than the average dentist, but they can not make a crown better than a good dentist. It is equally true that a good many of the x-ray laboratories make a cheaper radiogram better and quicker than an amateur radiographer, but they can not make a scientific radiogram better than an experienced radiographer who not only possesses radiographic technic, but a knowledge of anatomy and pathology as well.

Another factor which is undesirable is that men who conduct these x-ray

laboratories are inclined to place themselves on a level with the profession, many of them assuming the title of "Doctor," and are being so addressed by their patrons. Dental societies have unconsciously promulgated this idea by inviting commercial radiographers to read papers before their meetings. At the present time the Educational Council of the National Dental Association, The Faculty Association, and the state boards, in fact practically every reputable dental body, is trying to raise the standard of dental education by increasing the length of the term and by raising the entrance requirements. Still many of the members of the profession are unknowingly lowering those standards by sending their work to commercial laboratories, and some dental societies are doing the same thing by inviting commercial radiographers to read papers.

The prostitution of radiography by commercial laboratories is a fact, and the condition existing at the present time can be successfully combated only by men realizing that radiography is a profession and should be followed by professional men and supported by professional men, and not commercialized.

It is useless to try to raise the standards of the profession in one place and let them down in another.

Orthodontic Appliances for the Gullible

THERE is no other branch of dentistry in which the members are more easily deceived than in orthodontia.

It has been said by a great advertising expert that a fifty cent article can easily be sold the public at a five dollar valuation if it is backed by a proper, systematic advertising campaign, keeping the article constantly before the prospective customer. This adage equally applies to worthless orthodontic appliances. They can be sold in large quantities to the dental profession if given persistent, vigorous advertising claiming them to be the eighth wonder of the world and capable of working while you sleep.

Orthodontic appliances whose basic principles are ludicrous; appliances which no man would ever have the courage to demonstrate in a clinic before a society of orthodontists; appliances so crude in mechanical construction that they resemble a barbed-wire trench entanglement in the mouth—the sum total of all of which means appliances that are absolutely rubbish—are sold the members of the dental profession because they are told to buy such antiquated, unscientific apparatus by manufacturing concerns who know the power of advertising. This is not a case of "blind leaders of the blind," but a case of wide awake leaders of the blind.

Shades of the past! How long is the dental profession to remain in peaceful ignorance as to modern orthodontic technic? Such ignorance not only renders possible the sale of detrimental so-called "orthodontic" appliances, but it compels children to have their teeth tampered with for several years with inefficient, harmful brass.

Education and information are what is needed. Orthodontists should read papers before dental societies. The dentist should be just as well informed

on the progress being made in orthodontic technic and appliances as he is on other recent developments, such as the filling of root canals, radiography, oral prophylaxis, focal infection, conductive anesthesia, oral surgery, etc., and it is the duty of the orthodontist to give him this information.

Orthodontists are prone to read advertisements calling attention to these "wonder appliances," laugh, and turn over another page; but it is to be remembered that while indifference to such appliances does the individual no harm, even the sight of such methods of treatment does his profession a great injury.

This is considerable space to devote to an "overnight" orthodontic machine; however, this all reminds us of the Robert Burns classic: "Oh wad some power the giftie gie us, to see oursel's as ithers see us!" Then, too, it demonstrates that you can lead a horse to water and you *can also* make him drink.

The Forsyth Dental Infirmary for Children

The Post Graduate School of Orthodontia of the Forsyth Dental Infirmary for Children is to resume its activities which have been suspended during the war. The next session will begin October 6, 1919, with an Advanced Course of thirty-two weeks. Harold DeW. Cross, D.M.D., Director, 140 The Fenway, Boston, Mass.

American Institute of Dental Teachers

The annual meeting of the American Institute of Dental Teachers was held at the Piedmont Hotel, Atlanta, Georgia, January 28-30th, 1919. The following officers were elected for the ensuing year: President, Dr. R. W. Bunting, Ann Arbor, Mich.; Vice-President, Dr. Arthur D. Black, Chicago, Ill.; Secretary-Treasurer, Dr. Abram Hoffman, Buffalo, N. Y. Executive Board, Dr. G. S. Millberry, San Francisco; Dr. A. H. Hipple, Omaha; Dr. A. E. Webster, Toronto. The next regular meeting will be held at Detroit, Mich. By order of Abram Hoffman, Secretary, 381 Linwood Avenue, Buffalo, N. Y.

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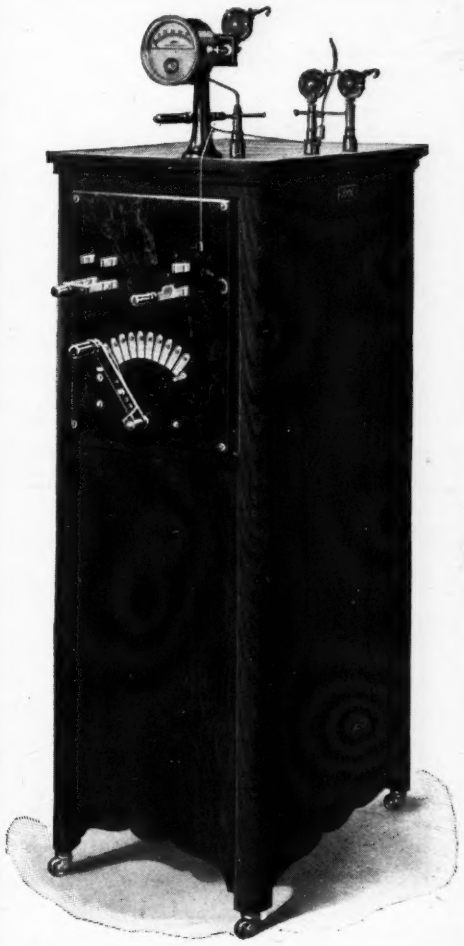

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